Light and Lighting

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Design

PRACTICAL lighting always involves design. Merely to hang a bare lamp somewhere is a contrivance with intent to illuminate something and, to this extent, is design. The lamp itself is a product of design of a much higher order and so, indeed, is all the equipment associated with it. But what we ordinarily mean by designed lighting is, of course, the outcome of much more thoughtful planning and consideration of the ends to be accomplished than is the crude lighting instanced above. Every item of a lighting installation is part of a "universe" into whose plan as a whole it should fit as well as may be; and the lighting given by the installation should—in those hackneyed but ever apt terms—be "sufficient and suitable" for mediating all intended visual effects. It has been said often enough—though it will still bear repetition—that collaboration between designers of building interiors and designers of lighting is in the best interests of both as well as of the "users" for whom both building and lighting are intended. This, together with other aspects of design, is the subject of discussion by different writers in this issue.

So Far in the Twentieth Century

By A. DOUGLAS JONES
and JOHN BICKERDIKE,
F/A.R.I.B.A.

Fig. 1. *Victorian domestic interior.*

There may be doubt as to whether an artistic achievement is good or bad: but—whether we like it or not—there can be no doubt that it is the inevitable product of its age.

No achievement can be considered in isolation and as unrelated to the past or to its own immediate period of history . . . it cannot be regarded as an immaculate conception that enters the world without parentage and by doing so gives us no standards with which to compare it.

And so, to try to appraise a building out of its context, and without knowledge of the forces that bring it into being, is to miss the whole point.

Unfortunately not all students of architecture realise this (and some may even try to baulk the issue), but it must, nevertheless, be the basis for an understanding of buildings and for a reasoned assessment of them.

And now, having said that, let us consider it in the light of some twentieth century examples.

The Interior

This domestic interior which was photographed at the turn of the century belonged to a rich man. He may have inherited his money or he may have obtained it in other ways; but in an age when wealth and respectability were synonymous and when the amassing of wealth was regarded as a virtue, then it was not unnatural that the possessor of it should want to show his achievement in a tangible and visible form. If the result has the appearance of being self-satisfied it is so because it was the product of a great middle-class sense of security born of material success. If it looks ostentatious it is so because it belonged to a great middle-class which had no ancient tradition to impose restraint. This interior also shows the handiwork of the craftsmen who were available to fulfil the needs of the Victorian upper and middle classes. The fact that they were available reflects not only a demand for their existence, but also that this age provided a stability that was essential to crafts that needed long periods of apprenticeship.

Several hundred years earlier, the medieval church had also provided craftsmen with a stable background though of a different order—as has more recent periods of history. But in this Victorian age of security, when leases were for 999 years and when the amortisation of buildings was for 200 years instead of for 20, it was logical to build and to decorate for eternity.

A Move Towards Simplicity

The dictum of the old medieval scholar, William of Occam, which is so relevant to-day, that . . . "It is vain to do with more what can be done with fewer" . . . held no interest for the Victorian because it was irrelevant to him. Why should the man who could afford to travel comfortably through life with a cabin trunk wish to travel austerely with a suitcase? The Victorian and Edwardian interiors with their dark backgrounds of paints and papers, velvets and moquettes of low "value" were also well adapted to lighting by oil or gas or by early carbon filament lamps of low brightness. And it was not until after 1907, when the first tungsten lamps came into being, that the dark backgrounds would have become a source of inconvenience from a lighting point of view. But between the turn of the century and the end of the First World War changes had taken place, and

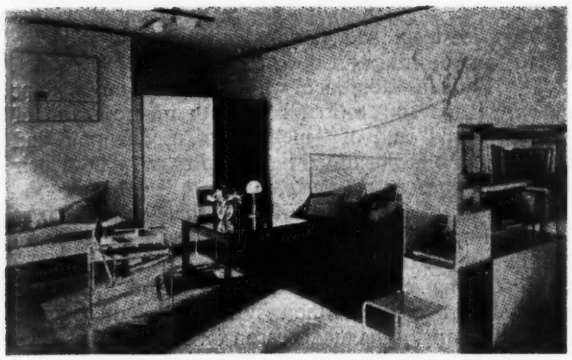


Fig. 2. Gropius' own living room, 1926.

the most important of these was the more even distribution of the national income and the shrinkage between the most extreme examples of poverty and wealth. Although much building was still to be done in the manner of the past, ostentation was beginning to give way to a new austerity. This changed attitude of mind was helped along by the need for greater economy in the use of labour and materials and in the need for building that required less maintenance. And so decorative cornices and other elaborations began to disappear as if in sympathy with the new taste which made a virtue out of necessity. Even in existing buildings the elaborate rococo decoration was sometimes stripped out and occasionally with unfortunate results, as its removal could lead to a worsening of acoustic conditions.

A "Rational" Approach

Another important change that manifested itself after the First World War was the transition from "Certainty" to "Doubt," and whereas the Victorian took life at its face value his grandson found that uncertainties were beginning to creep in. Presumably this was a necessary step towards the development of a more inquiring attitude of mind which, in turn, led to the setting up of research institutes and laboratories and to our own Building Research Station in about 1921. While it became increasingly clear that it was necessary to develop a "rational" approach to architectural problems, progress was inevitably hard won and therefore slow.

Although the idea of a "rational" approach has gradually become accepted, the pace of the scientists has not kept up with the demands of the architects, who, unable or unwilling to use traditional forms, have nothing to fall back on and are therefore without a sheet-anchor. So, for this very reason even the best of the new buildings, which incorporate the latest scientific "know-how," may have to rely for their architectural interest on the inventiveness of the architect. This tends to lead to "cleverness," while in the worst of the modern buildings (which merely ape the best of the new) it produces the most unfortunate results.

The Bauhaus

At about the time that the Building Research Station was opened, Walter Gropius—who is one of the pioneers of the "modern" movement—was made principal of the art school at Weimar (1919). This art school, which became so well known, was called the Bauhaus.

Gropius, who was then an architect of some importance, got together a brilliant team of artists and teachers, and

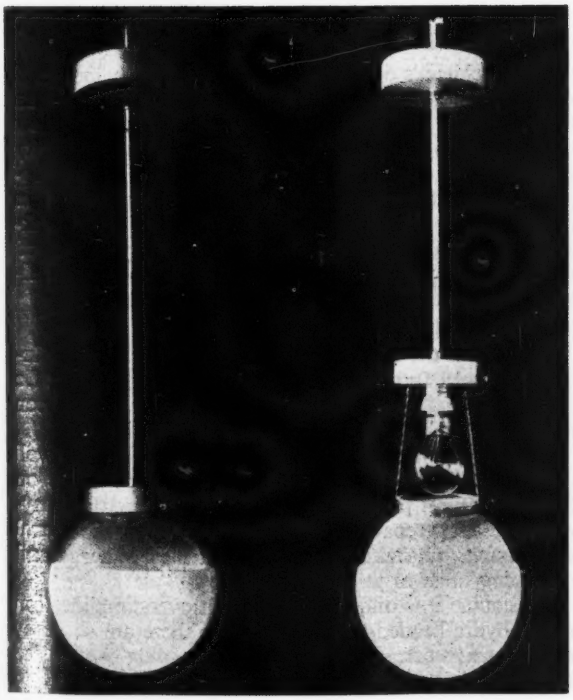
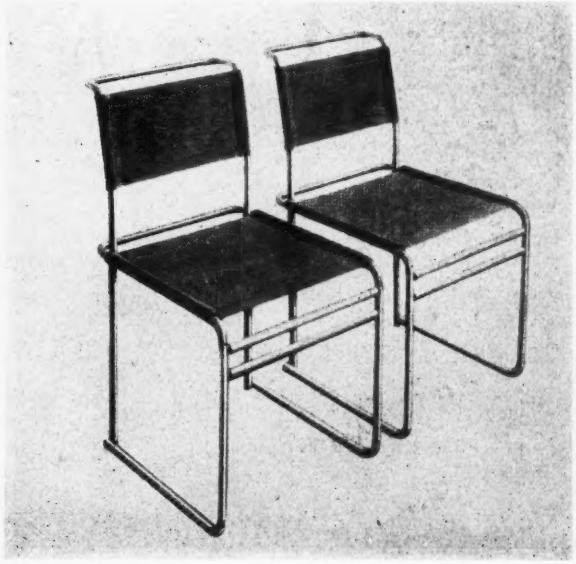


Fig. 3 (left) and Fig. 4 (below). Bauhaus designed lighting fittings (1925) *and tubular steel stacking chairs* (1926).



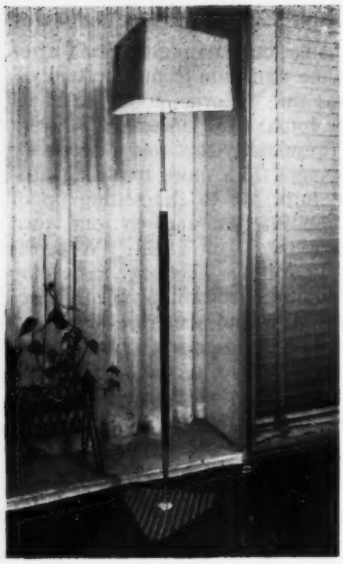


Fig. 5. The designer's dilemma is reflected in this lighting fitting.

Fig. 6. The Pavillon Suisse, the Swiss students' University hostel, Paris. Built in 1930-32. *The date is the relevant factor.*

the lead that they gave during the short period of the Bauhaus' existence had world-wide repercussions in the field of architecture and design.

The Bauhaus approach was based on an attempt to analyse and to " rationalise " both in the realm of " human need " and of " methods of production," and the two examples illustrated here help to show how their work has influenced design to-day.

It was in the Bauhaus workshops that the translucent glass lighting sphere was evolved—in order to get away from the surface brightness of the tungsten lamp—and the metal stacking chair, designed for the multi-purpose rooms which necessitated the easy removal and economic storage of chairs. The main reason for showing these two photographs is to illustrate the new attitude to design which attempted to " rationalise " (in the face of bitter opposition) in an age which had provided its artists and technicians with a new set of conditions.

It is obvious that this " rationalisation " could go some way towards solving the new problems of the twentieth century, but only so much could be achieved. The " rational " solution depends, for its successful execution, on the information that is available, and it was not very long before saturation point had been reached. It is then that the architect has to wait on the scientist, and if the scientist is unable to produce an answer the architect has to get along without one.

Rather than remain stationary in an age of change and be considered reactionary the architect will tend to attempt the role of the scientist himself which he is not equipped to be, and the result may be sham scientific building and hackneyed architectural expressions.

In the eighteenth century architects of lesser ability were more likely to produce pleasant buildings than are architects of comparable ability in the twentieth century simply because their references were clearer. No architct, of whatever age, can be an unlimited source of invention, and so to-day we inevitably produce much mundane work.

The Introduction of Electricity

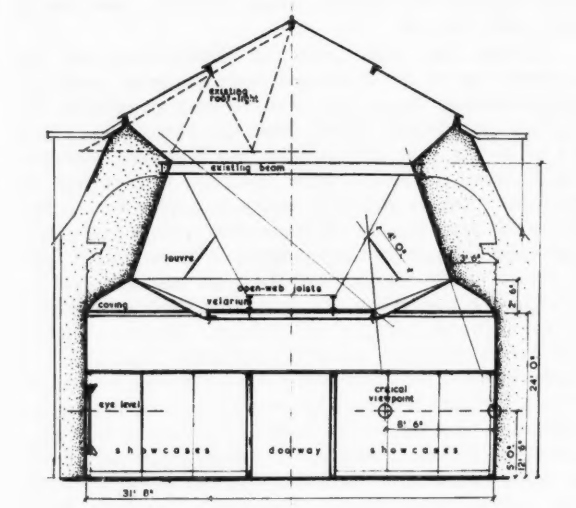
The architect's design range has been greatly increased by the introduction of electricity and to compare an interior lit by fixed and unadaptable oil fittings of low brightness with one lit by electricity, giving both flexibility and brightness grading, is most impressive. The development during this century of increasing brightness in interiors has led to the use of appropriately lighter backgrounds and fabrics and lighter woods for furniture : and light distempers have replaced the more expensive wallpapers and paints.

Le Corbusier

As well as the Bauhaus, another great formative influence of the 1920s and 1930s was the French architect Le Corbusier, and most architects of to-day have been directly or indirectly affected by him.

Corbusier, who is both a practising architect as well as a prolific author, has acted as a sort of purgative on the architectural profession. Perhaps he, more than anyone else, has prepared the ground for an architectural reassessment by shaking people out of their lethargy and by forcing them to think anew.

Of course it is difficult to avoid an over-simplification of this hydra-headed problem because there are so many influences at work. For instance, the building owner who is more interested in first costs and in maintenance than



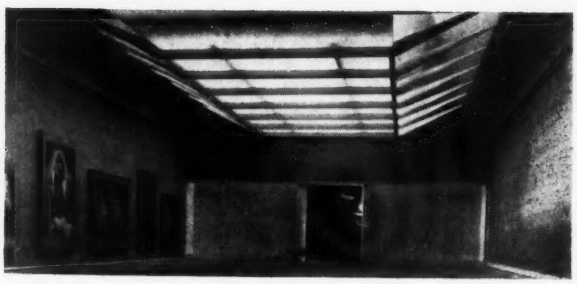


Fig. 7. Proposals for a new gallery for the Birmingham Art Gallery.

in running costs is bound to influence the appearance of the building. But if we may limit our discussion, then two things have become most apparent since the second world war. The first is that our minds are now somewhat cleared of past preconceptions and we are more ready to examine the past objectively and while still intending to discard the useless and irrelevant we are, nevertheless, prepared to accept the fact that we are the products of the past.

The second post-war factor is that more emphasis is being placed on people's needs and a considerable amount of research is being carried out into "Human requirements." This has already been reflected in the design of new schools, hospitals, factories and art galleries—and herein is the corner-stone of a new architecture.

So far this discussion has been of a general nature, so perhaps it might be as well to amplify the points that have been made by considering certain buildings in some detail.

The Art Gallery

In recent years the art gallery problem has been re-examined, and the study provides an interesting example of the way an architect reaches his solution with the right kind of help from the engineer and scientist.

The lighting of the pictures in art galleries has always been a problem because the existing galleries provide little scope for the development of a solution through the traditional process of trial and refinement. More recently, however, modern research has provided information which leads to an explicit understanding of the problem. We now know, for example, something of the adaptation mechanism of the eye; of the way in which brightness contrasts cause discomfort and prevent clear seeing and of the natural tendency of the eyes to be attracted to the brightest spot. In other words, a design basis has been evolved. We now realise that the pictures should be the brightest part of the view so that they may be studied without strain or distraction from brighter surroundings; and we also know that the careful distribution of light over the picture wall and the control of the relative brightness of all main surfaces is also important. A study of the reflection values of paintings using modern instruments provides an indication of the kind of suitable backgrounds. Elementary as this may seem to-day, it had not been appreciated in such an explicit manner before, although it may have been suspected by the more intuitive designers of the past. But without modern methods of calculation the achievement of a solution was left to chance. Now, these factors condition art gallery design.

But the art gallery serves relatively simple functions as does the concert hall; the one is used for seeing pictures and the other for hearing music. With buildings such as schools, hospitals and factories the range of requirements is wider and correspondingly more difficult to solve.

The Foundry

It is now felt that by using good lighting and colour a foundry can be made a better place to work in. But the key factor to this is ventilation. If the ventilation is uncontrolled, then heat, dirt and fumes spread and obscure the roof glazing and so nullify attempts to improve the appearance by using colour. Therefore it is necessary to make a study of the heat flow which controls the ventilation. By this and by other means the atmosphere can be kept clean, and only then will it be possible to achieve good lighting and use colour effectively. This analytical attitude has also to be extended to the choice of structure. Steel may be difficult to maintain in a corrosive atmosphere and its complex surfaces will collect dirt; but with concrete it is possible to mould its form to prevent dirt adhering to it. Deep concrete beams can also be made to act as louvres to screen the view of the roof lights and to provide large, well-lighted surfaces on which colour may be used. This last point is important because the roof area is the one part of a foundry where colour can be applied. The drawing helps to show some of these proposals.

The Architect's Problem

To the architect, lighting has to be closely integrated with the whole design, which involves the solution of many different problems; and therefore his approach is different from that of the engineer who is primarily concerned with the efficiency of sources, lamp design and light output and with the length of life, cost and the design of fittings efficiency.

The architect is also interested in these things, and he

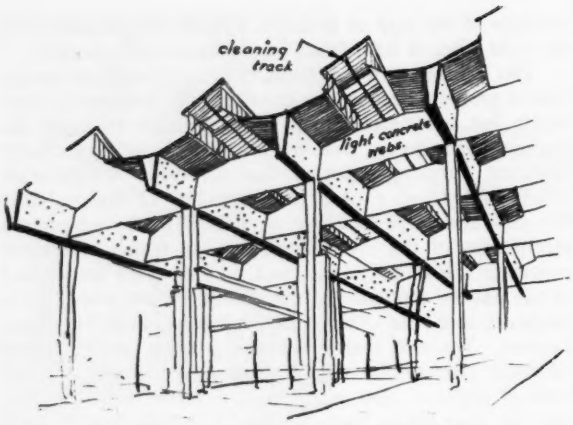


Fig. 8. Sketch proposals for a foundry.

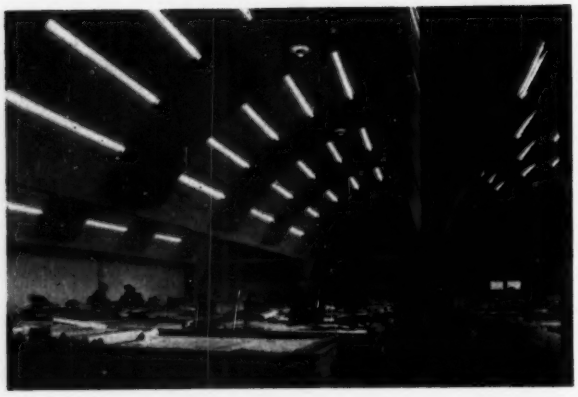


Fig. 9. Example of barrel vault ceiling. Architect, Richard Sheppard, F.R.I.B.A.

relies on the engineer for their solution, but he may sometimes feel that " source efficiency " is too often regarded as the only problem to be solved. But quite apart from the technical difficulties that have to be overcome, there is also an ever-present aesthetic which has to be considered. One of the architect's present visual aims, which is not without precedent in history, is to obtain clean lines. Partly for this reason the concrete barrel vault—which is considered to have design potentialities—is popular.

The photograph illustrates one way in which lighting and acoustic treatment may be combined in a barrel vault —in this case in a drawing office. If other services had been required the solution would probably have had to be a different one.

To-day, the high levels of illumination and the common use of the fluorescent source implies more and bulkier fittings which tend to overwhelm an interior. As lighting installations which cover an area equivalent to 10 to 20 per cent. of the floor are becoming common, the louvreall ceiling has been developed to cope with the problem. But its high cost makes its application limited. Since the war, the use of suspended ceilings has greatly increased. Their primary purpose is to provide a space in which to run services and ducting—accessible yet out of sight. The need for such space is in itself an indication of the changed character of buildings. Modern structural techniques—slender columns—minimum thickness concrete floors, and thin partitions—provide no natural channels in which to run the complex arteries of a modern building. But the false ceiling is expensive because it raises floor-to-floor heights. For this reason its function is being extended to incorporate sound absorption, heating, lighting and thermal insulation. The light fittings for mounting into these ceilings are hightly complex and are often two and three times more expensive than the suspended fittings they replace, partly of course because the lamps need more elaborate screening. But suspended fittings disrupt the clean lines of the interior and while the architect is trying to break away from their constraint the engineer still seems to give them preferential treatment. No doubt the pre-war popularity of the indirect cornice lighting was an attempt to meet the architect's demands. In terms of cost it is getting increasingly difficult for the architect to use both suspended ceilings and fittings, but the Americans seem to be more aware of this. They have ceiling designs on the market which do go part way to answering the problem and one of their methods employs louvres of acoustic material suspended between lamps. Another system uses a series of channels containing wiring and gear which hold the lamps above a suspended ceiling of translucent plastic and sound-absorbent ribs. In many modern buildings the problems of natural and artificial lighting are becoming inseparable. For example in schools the most economical answer to the daylighting problem of the class-rooms has been to employ a combination of windows and top lights and in halls and corridors only top lights are often used. This trend is becoming more common in other types of building which require good lighting such as laboratories and drawing offices. Thus the ceiling is becoming an even greater complex of roof lights and lamps, ducting and conduiting, beams, acoustic treatment and pick up channels for demountable partitions and screening for roof lights to prevent sky and sun glare.

Life may be difficult for the illuminating engineer, but from what has been said he will perhaps realise that it is equally difficult for his architectural brothers.

Acknowledgment is made to the following for illustrations used in this article:—

Fig. 1, The National Building Record; Figs. 2, 3 and 4, from " Bauhaus 1919-1928," by permission of the Charles T. Branford Company, Boston, Mass.; Fig. 5, Troughton and Young (Lighting), Ltd.; Fig. 6, Reproduced from " Le Corbusier et Pierre Jeanneret " (Girsberger, Zurich); Fig. 7, By permission of the Director, Building Research Station; Fig. 9, By permission of Richard Sheppard, F.R.I.B.A.

Trends in Design

By Sir GORDON RUSSELL, M.C., R.D.I.

Director of The Council of Industrial Design.

Running any kind of business isn't too easy to-day, so it is not surprising how many people in every trade concentrate pretty exclusively on their own job. But the fact that so many developments are occurring in all fields makes it more than ever necessary to survey the overall picture from time to time. For in no previous age have trades so rapidly affected one another; and frequently the connection is not nearly so close as, say, that between stainless steel and knife-cleaning machines or man-made fibres and growing cotton.

To-day many people are wondering whether the modern movement in painting, music, architecture and other fields has come to stay or whether it is just another style in the same way as there have been fashions for reviving classical and Gothic architecture in the past hundred years or so. This doubt as to the permanence of new, strange and often somewhat harsh forms is expressed from time to time not only by Royal Academicians but by such people as the makers of components and furnishings used in buildings. It is, therefore, important that we should try to make up our minds on this point, as no prudent business man can be expected to found a long-term policy on a purely ephemeral fashion. The first thing to remember is that any new movement has its good and not so good exponents, its serious experimenters and its charlatans. There are a good many of the latter about to-day, but that does not make the achievements of the real pioneers any the less.

As architecture is the mother of the arts it is there that we must look for guidance so far as all trades connected with building and furnishing are concerned. What happens in architecture is bound to affect this wide range of trades in time. What do we find? We find a marked tendency to use the machine for the production in factories of components which can then be assembled rapidly on the site. This has led to a growing demand for co-ordination, which has expressed itself in a number of ways, not least by the founding of the Modular Society. It is an immense task, for the problem is not only to make assembly simpler and therefore cheaper, but to achieve also a sense of human scale and intimacy in buildings, many of which tend to grow to immense sizes. At the same time there is a wish to have as much daylight as possible in houses, to have a more open plan so that space can be used for a variety of purposes, to avoid unnecessary labour in the running of the house and so on. The humanising of the machine is receiving far more attention in many fields of endeavour and will doubtless in time purge away the uncompromising harshness and sterility of much of to-day's building. It is to be hoped that it will lead to a greater appreciation of beautifully proportioned simplicity no less than the need, which many of us feel on occasion, for the exuberance which expresses itself in splendid decoration.

Therefore, though he may dislike modern architecture, a prudent business man simply cannot afford to ignore it. And how often is dislike the result of ignorance as to what the architect is trying to do? The architect, like the rest of us, is trying to find ways of using the machine

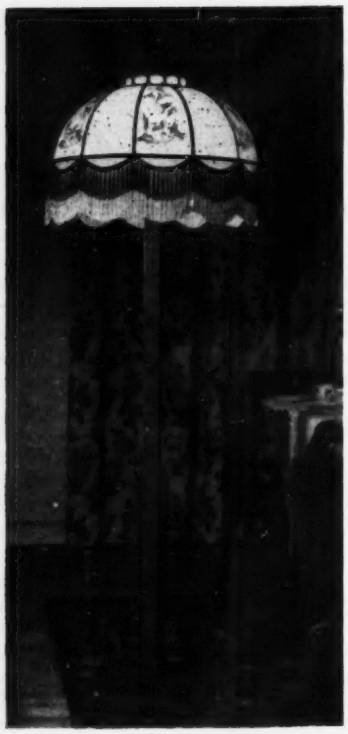


Fig. 1. *Many of the pre-war lamps were regarded as decorative objects, often with little regard to their value for illumination. And were they r e a l l y decorative? The shapes often seem rather cumbrous and unrelated.*

Fig. 2. *The emasculated descendant of the old rushlight holder in which the flex must, of necessity, appear as an untidy addition. Note the wax drops on the candle and the cracks in the parchment shade.*

Fig. 3. *All kinds of materials have been tried for shades—these thin wood slats have a distinct and pleasing character of their own.*

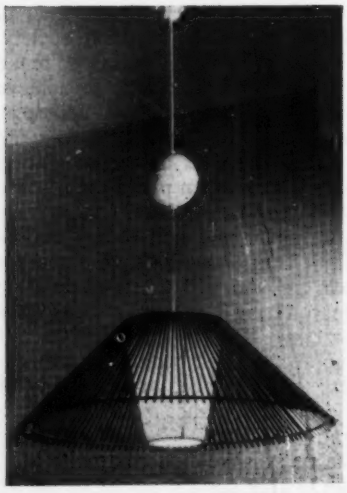
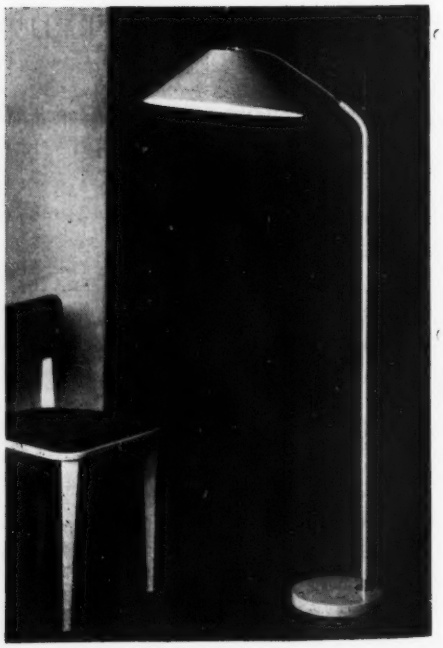


Fig. 4. *A good straightforward design which has been carefully detailed. Note the refinement of the flexible tube at the top which also gives both lightness and a variety of texture.*



intelligently to solve problems of accommodation in houses, factories, offices, hospitals, and all other types of building. It is, surely, rather odd that an office building resulting from an attempt to solve new requirements, using new techniques and new materials, should look almost exactly like a Florentine palace of the fifteenth century or a factory should look like an Egyptian temple : yet, strangely enough, such delusions do not seem to be at all uncommon.

In fact, the considerable development which has taken place over the past 25 years in town planning, landscape architecture, architecture and interior design, has been stimulated to a considerable degree by a deep-seated revolt against the ugliness and squalor brought about by the rapid and haphazard introduction of the machine. Although it is likely to take several generations to achieve a reasonable standard of beauty in all machine-made things there is little reason to suppose that people will not continue to pursue this ideal. We must remember how many centuries of development preceded the flowering of design in hand-work which took place in the eighteenth century. Nor is it reasonable to imagine that in the future all our wants will be catered for by the machine. That would be a dull solution. The machine will undoubtedly have to cope with most of them, but any really civilised community will demand, for special purposes and occasions, the extra variety and quite different beauty which can only come by the skilled use of the craftsman's hand. In fact, the two methods are complementary, but they must be kept distinct. Nothing is so unsatisfactory as to imitate one method by another.

For so long in many trades we, in England, have been content to avoid much original thinking, which admittedly is hard work, by copying the designs of our ancestors, who thought a great deal. Yet we have made the copies by quite different methods from those they used, often in new materials and to solve quite other problems. For example, the problems of lighting by candles and electric light are different in many ways. The imitation electric candle is not even a very efficient way of using the new light, which is hard and trying to the eyes unless properly shaded. It has not the mellow quality of candlelight, nor the slight flicker which was reflected from every burnished surface or polished glass facet in the lovely seventeenth and eighteenth century candelabra. Yet we go on copying these instead of evolving shapes equally good and more suitable for the new conditions—shapes which exploit to the full the many exceptional qualities of electric light.

All too often I hear the lament that something in the modern idiom is "not British." But we ought not to forget that in the modern world three important developments have occurred which make it far more likely than was the case a hundred years ago that goods produced in countries thousands of miles apart will bear some family resemblance. Firstly, the immense improvement in communications has made it possible to see illustrations the other side of the world at the same time as they are being shown in London, Paris, or New York. Even samples can be shown a few hours later. Secondly, most goods, wherever they are made, are produced on similar kinds of machines. Thirdly, industrialisation has created a vast, well-to-do, artisan market, an entirely new and fascinating development of greater potential importance to Britain than to any other country in the world. But to get a considerable share of this market it will have to be approached in a more imaginative way than is being employed at the present time. It is fatally easy to talk down to it and many retail buyers seem determined to do

Fig. 5. A room in which wallpaper has been used on the main wall with good effect, the plain wall and tiles being a foil.

so; they have an ingrained belief that the working class is bound to go on buying what it has bought in the past. They seem unable to realise that there is already a considerable market for better quality goods of medium price which mass production can supply if machines are used aright. And by better quality I mean not only better workmanship and material but a much higher standard of design. But this will need intelligent and enthusiastic salesmanship, instead of just taking money and wrapping up, which until recently has been the nearest approach to selling in many shops. Already the shops which are prepared to give a lead to the public in this matter—and fortunately the number is growing—are finding the response encouraging. Of course, in the long run, the most successful are bound to be those who have taken most trouble over the training of buyers and sales staff.

Good design has come to stay and can undoubtedly be commercially profitable. But it must be admitted that it has brought a host of imitations of a flashy and meretricious kind which are being palmed off under that wide spreading umbrella labelled "contemporary." In fact, anything made to-day is contemporary. But the word has been misused to indicate a new style, and many people do not seem aware that there are well-designed things of to-day, and there are caricatures of such things. It is nonsense to talk of "early contemporary" or to say "contemporary is the furniture of the future," as I have heard lately. Such things do harm to a serious movement and cannot have a high survival value.

There is no more urgent task to-day for the business man who has become convinced of the part which better-designed goods might play in his business than to learn to discriminate between the true and the false. This is

Fig. 6. The small dining recess is a modern development. Here all is neat and easily cleaned. Colour and pattern are obtained in such details as the upholstered seats, the mats, pottery, etc.

Fig. 7. The lighting of a board room table is not an easy problem. Here flush ceiling-lights enable an unobstructed view to be obtained across the room.

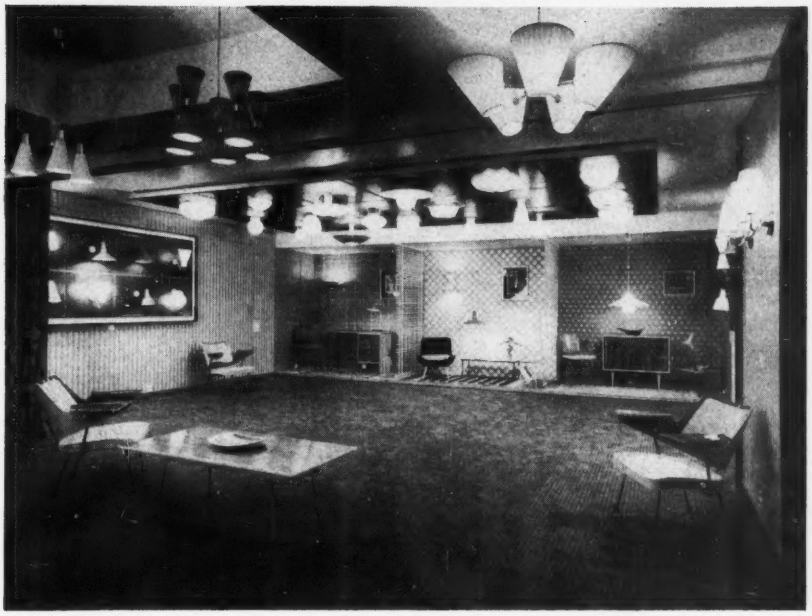


Fig. 8. A very real attempt has been made here to make a complete composition out of what is frequently a somewhat disorganised showroom for electric lighting fittings.

not something which can be learned overnight. Like the pursuit of any kind of knowledge it is a never-ending quest which grows in fascination as its scope enlarges. In an age when ugliness tends to be normal rather than exceptional, the training of the eye cannot go forward day by day unconsciously, as it could even among quite primitive peoples. That is why such a body as the C.O.I.D. has an important function to perform. Its magazine " Design " discusses such matters in a free and lively way, and its " Design Calendar " gives full details of forthcoming exhibitions and events.

It is useful to remember that one can learn from any trade. Indeed, to refuse to find time for anything which cannot be said to have a direct bearing on the trade which provides one's livelihood is one of the surest ways of taking an equally short view on design problems as they crop up. For instance, a sound design policy should take into consideration far more than the products of the firm. The company should speak with the same voice whether it concerns letter-headings, vans, furnishing and equipment of offices, showrooms, works canteens, layout and colour of factories. Such an integrated outlook cannot be achieved overnight. But do not forget that such matters are receiving very careful attention in the most forward-looking firms in many industries. Such a common-sense practical way of exploiting the value of good design in business has so much to commend it that to-morrow surely it will have become commonly accepted practice, like employing an accountant or a typist. In however small a way it be done there is much to be said for making a start now. The Council of Industrial Design may be able to give valuable advice in the initial stages and is most willing to discuss a particular design problem confidentially and without charge.

The Council does not design anything itself: designing is part of the production cycle and must be done in the closest possible touch with the factory concerned. But it has much experience and " know how " on this subject —in all kinds of industries and in many countries. It maintains the most complete record of British designers, from which it is prepared to recommend a designer for a particular job. To discuss the design policy of a firm after a careful investigation of the particular conditions is one of the most important sides of the Council's work. Manufacturers should remember that it is seldom necessary to employ a designer from abroad in order to enter that market. Trained British designers can hold their own with any country in the world, provided they are given reasonable time and facilities. A good industrial designer will want to make a thorough investigation of the firm's manufacturing plant, methods of packing, advertising, selling, and to be properly briefed as to the firm's requirements before starting on any design project. In the past the low status of designers in many firms has been an accurate reflection of the value set on design, as a potential sales asset, by the board. To-day design is fast establishing itself as an essential element. But it must be sound, imaginative and consistently applied. There are no short cuts.

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Design and Standardization of Lighting Equipment

By BRUCE MARTIN
A.R.I.B.A., A.A.Dip. (Hons.)

Head of Modular Co-ordination Studies, British Standards Institution.

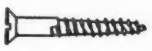
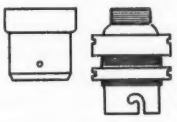
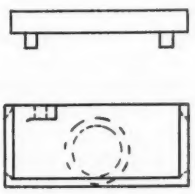
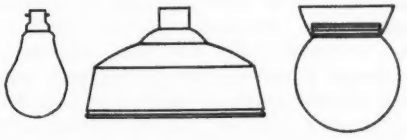
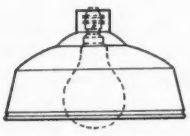
There are now about 50 national standards dealing with lighting equipment. These fall into two main groups: those concerned with basic requirements and performance and those describing particular electrical products. The latter group cover lighting fittings, lamps, fuses, switches, lamp-caps and lampholders, fuse plugs and sockets, distribution boards, connectors, a number of small components, cable, wire and conduit. Almost each year new standards are added to this collection, and there seems to be no end to this process of standardization.

In addition to lighting products covered by national standards there exist also products designed to be produced in large numbers for a particular job. Broadly speaking, lighting equipment can be standardized at three levels: national, firm, and individual user.

To discover the effect of all this standardization upon design it is worth studying the national standards in greater detail and limiting the study to lighting fittings. The standards may be conveniently divided into a number of groups or families covering the different parts that are required to assemble a complete lighting fitting. Table 1 shows the main groups in ascending order of complexity and the lighting fitting assembled from the individual parts. These parts fall into groups having definite characteristics. Group 1 covers conduit, wire, flexible cord and cable and similar small cross-sectional material generally produced in very long lengths. Group 2 covers very small articles such as screws and washers which have definite dimensions, which are usually agreed nationally and internationally. Group 3 covers more complex parts such as lamp-caps, lampholders, ceiling roses and conduit boxes which are determined primarily by function and usually require a degree of interchangeability; the lamp-caps must fit their associated lampholders and the ceiling rose fittings must be related to the appropriate conduit box. Group 4 includes still more complicated assemblies such as lamps, reflectors and lamp shades. These also have partly to be related to other products, but their design is mainly governed by considerations of light distribution and many other problems of user requirements. Group 5 covers lighting fittings considered as complete assemblies of parts. It is possible for a lighting fitting to have all the parts according to national standards, and in this case the parts are designed and related to each other so that when assembled in a certain way they produce a particular lighting fitting.

Table 2 illustrates a simple example in which one item is taken from each group. But in the national standards each part is produced in a range of sizes and in a number of different patterns to suit variations in requirements. The result is shown in Table 3, which emphasises the large number of parts standardised in the case of one sub-group only.

With this range of parts the problem of assembly is complicated, for, although there is a variety of parts, they do not necessarily assemble with other parts. Thus a particular lamp-cap in Group 3 will only assemble with certain lamps in Group 4 and with certain reflectors in Group 5. The possibilities of interchangeability exist but

Table 1 **The types of parts needed for a lighting fitting**		**Table 2** **Showing a typical part in each sub-group**
GROUP	SUB-GROUP	PART
GROUP 1	Conduit	
	Flexible cord	
GROUP 2	Screws	
	Washers	
GROUP 3	Lamp-caps Lampholders	
	Ceiling roses Conduit boxes	
GROUP 4	Lamps Reflectors Lamp-shades	
GROUP 5	Lighting fittings	

they are limited by the design of particular parts and by the fact that these parts only fit a limited number of other parts. The idea of assembling a number of parts to produce a variety of different lighting fittings has been adopted recently by Crompton Parkinson, Limited, and successfully applied to their "New-Range" of fluorescent fittings. In this case 10 components can be combined in various ways to produce 54 separate kinds of fittings. This is a particularly good example of the application of standardization to design (see Table 4). But it is worth noting that none of the 10 parts accords with a national standard, so that while these various parts are interchangeable within the firm's own design, there may be little interchangeability with the products of other firms.

This leads to the main problem of standardization to-day which is how to relate the numerous standards to each other at all levels—international, national, firm, and individual user. Unless this question is squarely faced a steady increase in standardization may tend to defeat its original purpose. Instead of simplifying and clarifying basic data and reducing unnecessary variety it may, for want of analysis and awareness, accept ever-increasing variety by "standardizing" particular solutions rather than common principles and basic products.

The process of standardization is an effort to provide data upon which design can be based. Whether it is a small group of persons in one firm who get together to examine the problem and determine the basis for the design, or whether it is a national committee composed of representatives of industry, users and Government, who confer in order to agree jointly on a basis for a common design, the method and the intention are similar. The standard document presents agreed data which is basic to the design of the particular product.

In principle it is desirable that there should be the widest agreement on the simplest elements and that the process of standardization should proceed from the simple most universally used parts to more complex parts.

For if there is no agreement on the basic elements combinations are extremely limited and variety of assembly is reduced. For example, suppose a designer starts to design a new lighting fitting and, assuming he has settled his performance requirements, he must decide upon a light source and will almost certainly select one of the lamps already designed and described in a national standard. In doing so he automatically accepts a certain lamp-cap and so is obliged to accept the related lamp-holder. Also since he has chosen a certain lamp he can select only those reflectors which are designed to relate to the lamp in question. If at this stage he decides that the reflectors described in the national standard do not meet his purpose, and if he cannot find a suitable reflector amongst the standards produced by individual firms, then he needs to create a new part to complete his particular lighting fitting. The designer who accepts a measure of standardization will first utilise the parts covered by national standards, then those which fit the national standards and are part of a firm's standard range, and

Table 3
Lamp Caps

Showing how a single product is produced and standardized in a range of sizes and in a number of different patterns. A similar table can be drawn up for each item in Table 2.

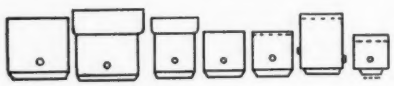
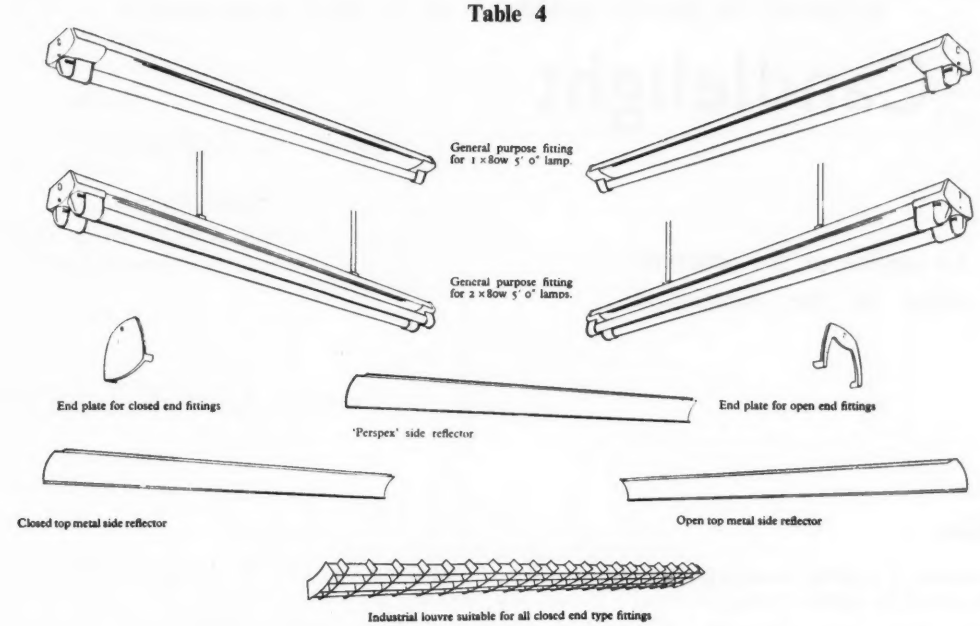
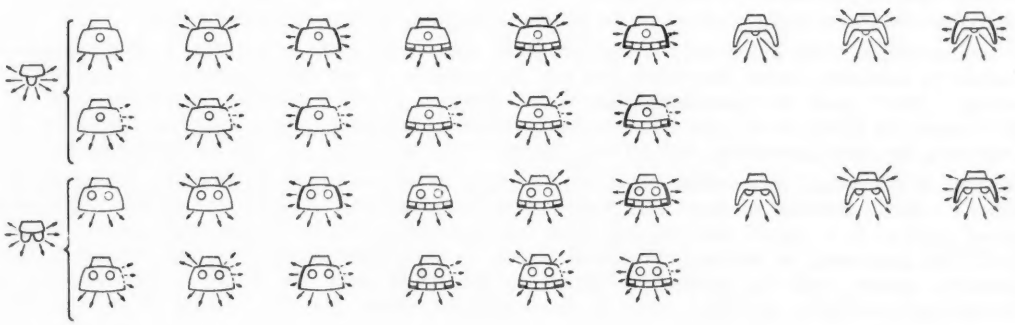
B.S. 52 : 1952	
B.S. 98 : 1947	
B.S. 495 : 1933	
B.S. 841 : 1939	
B.S. 1164 : 1952	
B.S. 1298 : 1946	
B.S. 1875 : 1952	

Table 4





The lower half of the above table shows the range of single and double lamp fittings which can be made up from the component parts in 'Permawhite' finish. A number of these are also available in the Vitreous finish making a total of 54 different fittings.

finally the new part "standardized" by himself for the job in question. This illustrates the need for general agreement on basic elements and the desirability of restricting standardization of end products. It also emphasises the importance of designing parts in such a way that there is a maximum of interchangeability between them and those parts related to them.

Whether he realises it or not the designer's freedom ceases as soon as he creates, for at that stage he has "set a standard." This standard may or may not be followed by others. If it is taken up by a group it may become a standard line or standard product of that particular firm. If it is taken up by a number of groups in a given country then it will become a national standard, and if its use further extends then it becomes an internationally agreed design.

In this way it may be seen that there is no fundamental conflict between standardization and the designer. On the contrary, by providing elements of basic data it gives him an excellent start on his path towards designing to suit the user's requirements. He can utilise parts which have already been well and carefully designed, and in doing so will reduce his work on detail in order to give more attention to methods of assembly to satisfy more precisely the user's needs. The acceptance of standards makes for economic and better quality design. The designer working with standards builds on the work of his fellows.

By Candlelight

By D. W. DURRANT

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Lighting Fittings Department,
The General Electric Co. Ltd.

An outline of the decorative styles of the Renaissance

Sketches by H. P. J. ROBERTS

Introduction

As a means of lighting candles go back to antiquity. Churches in England had chandeliers before the Conquest, and at the end of the eighth century St. Peter's, Rome, had one carrying 1,400 candles.

However, it was not until the later Middle Ages that hanging fittings were introduced into English houses, and then usually in the form of two crossed pieces of wood with metal spikes or cups on the extremities to carry the candles. Coronas were sometimes used, and the illumination would be supplemented by torches held by servants or in frames against the walls. A single candle was often set on an iron pricket above the fireplace. This is the first recognisable start in this country of the history of lighting fittings as we know them to-day.

To endeavour to trace this history in the scope of one article could only mean so much omission that the result would be confusing rather than adding to any appreciation of the rich tradition in design which has been our heritage. For it must be remembered that whilst designers in any age derive inspiration from the continual struggle to make the fullest use of new materials and methods of production, such things as proportion do not have to be relearned by every generation, and all new thought is supplemented by what has gone before.

The aim of this article is, therefore, to provide a guide in a form which, although by its brevity is useless to the specialist, should provide an easy reference to those whose interest is more limited but nevertheless sincere. The period covered is a logical one, starting from the time when English houses were ceasing to be primarily strongholds and beginning to become homes, and ending at the beginning of the great Industrial Revolution of the nineteenth century, with its tremendous impact on the whole social life of the country, bringing with it the first gas lighting installation in 1802, and in the same year Humphrey Davy's discovery of the continuous electric arc.

For convenience, the conventional dates and titles of periods have been used, but design evolution is a gradual and continuous process with each phase merging into the next, making dates only broadly indicative; they are, however, useful as an aid to memory.

Because the basic principle which governs architects and designers responsible for interiors is to produce an entity in which everything "fits," the appearance of lighting fittings has always been conditioned by the mode of interior decoration at the time. Some data have, therefore, been included to provide the background. Due also to the continual influence and use of contemporary French styles, illustrations of these are included under periods to which they are not necessarily confined.

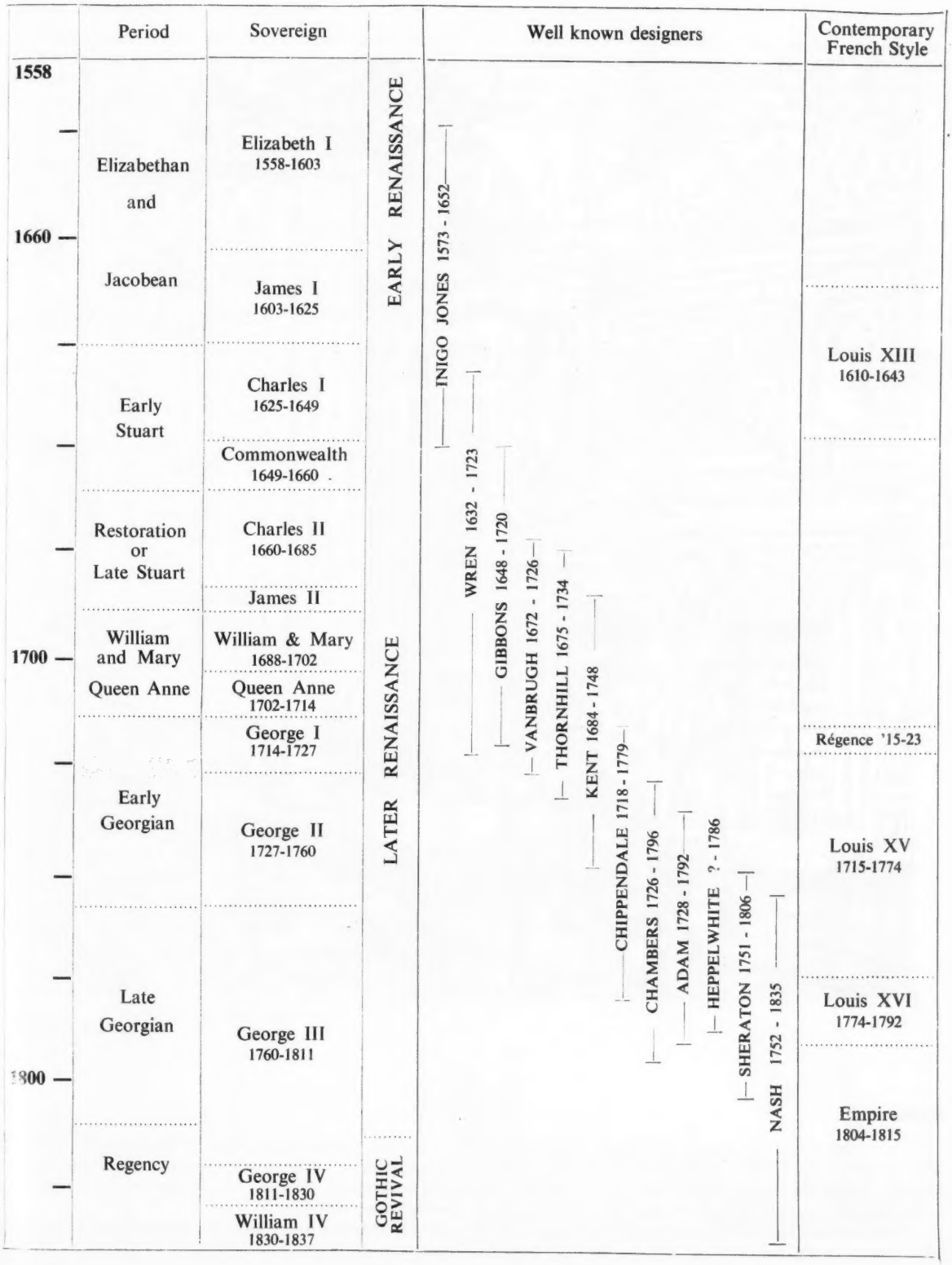
This is also the place to include a note on the candles themselves, which were either rush wicks dipped in kitchen fat, or a superior quality of wax or white tallow with cotton wicks. The wax chandlers were incorporated about 1613, and although at this time candles could be bought from candlemakers at about 5d. a lb., it was more usual to make them at home, a custom which lasted for another 100 years. Alternatively, the travelling candle-maker would call and could be hired for 4½d. a day.

Lighting engineers will also be interested to know that in 1760 it was recommended that a panelled room lit by six candles would require eight if the walls were stucco and 10 if they were hung with tapestries.

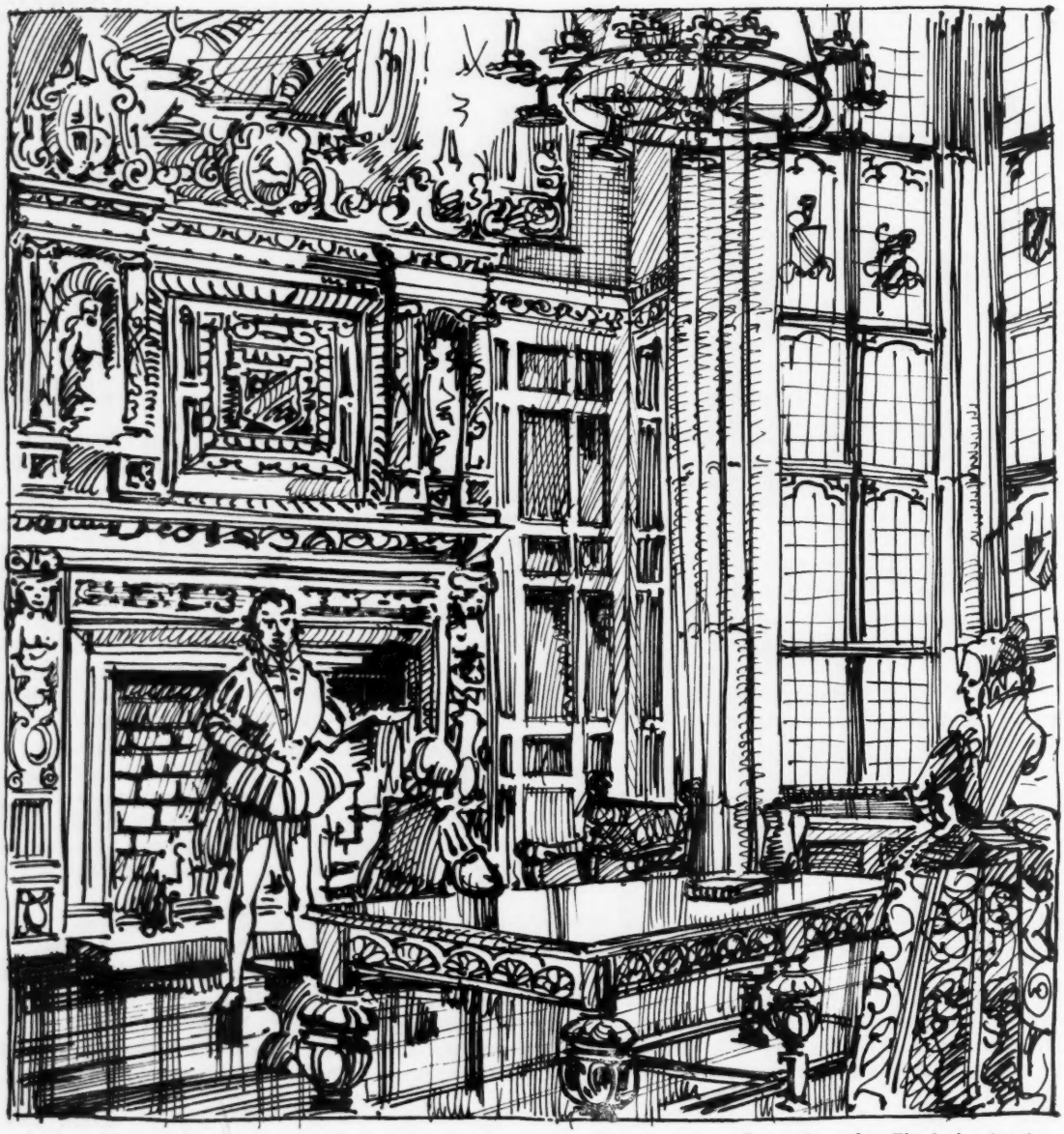
The word "chandelier" has been used throughout, as it appears in records as far back as 1495. It appears to have subsequently fallen into disuse, but was revived again about 1735 and remained until the present day.

Lastly, this contribution is offered not to give rise to any discussion on the merits or otherwise of copying or adapting from the past, but in the hope of spreading the author's conviction that the better the understanding of the past the fuller will be the enjoyment and appreciation of the present.

Chronological Table of the Traditional Periods of Decoration



Elizabethan and Jacobean 1588—1625



Impressions of an Elizabethan interior.

Background

Up to this time the Church had more or less monopolised all the architectural talent in the country, and over three centuries the Gothic style had evolved to a pitch of near perfection. Prior to this period, houses had been of necessity fortresses rather than homes, but with the coming of reasonable security, life became governed more by a spirit of reason, and an age of experiment and gradual development commenced.

The sixteenth century showed much building activity and, towards the latter end, the influence of Continental styles began to be felt.

The outstanding figure in architecture and decoration was Inigo Jones, who, on his return from Holland, introduced the classical style which became the basis of building for over 200 years.

Interior Decoration

Walls were mainly oak with typical carved panels. The most characteristic detail of the period was the strap-work scroll which gradually became refined into formalised foliage. Medallion heads in low relief and heraldic ornaments were widely used. Ceilings were plastered in geometric forms mainly derived from late Gothic vaulting, frequently using the Tudor Rose, pomegranate, portcullis, and fleur-de-lis as motifs. Towards the end of the period the ceiling became probably its most outstanding decorative feature, although the chimney-piece was the most striking.

Furniture

This was usually oak and in a broad sense characterised by extreme solidarity, instanced by the bulbous legged table and beds with carved canopies. Iron was the only metal used for fitments, and although varnish appeared about 1545, the finish was mainly oil and bees-wax. The court cupboard was typical and, whilst chairs had a Gothic throne appearance, painted leather was used for backs and seats.

Towards the end of the period furniture included cushions, rich textiles and fine silver plate. Tapestries hung on the walls.

The house of the Elizabethan nobility presented a scene of glorious colour, which played a much more important part in schemes of decoration than is apparent from the examples which have survived, as time has usually faded or destroyed the pigments and dyes.

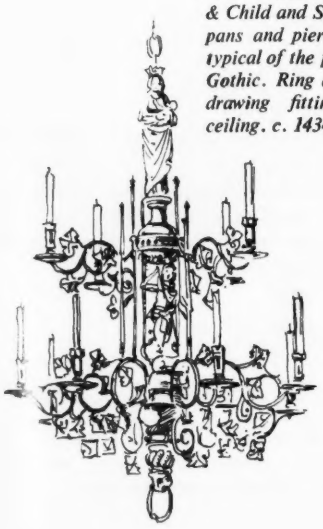
Lighting

In the early part of this period the chandeliers were still mainly wood or iron coronas. Some were imported from the Low Countries, introducing a Flemish influence even at this early date. Henry VIII owned some chandeliers made of silver. Crystal chandeliers were known in France.

" Plate candelstickes " for hanging on the wall were produced about 1600 in brass, copper, and earthenware. A common type consisted of a " D "-shaped back panel with a semi-circular tray to catch the grease. The candle was held in a sconce and not on a spike.

In 1612 a candlestick in the form of a man in armour is recorded. Snuffers came into use about 1620.

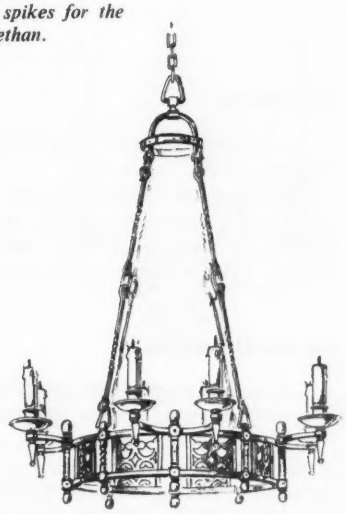
Between 1600 and 1625 the chandelier had become an important piece of furnishing.



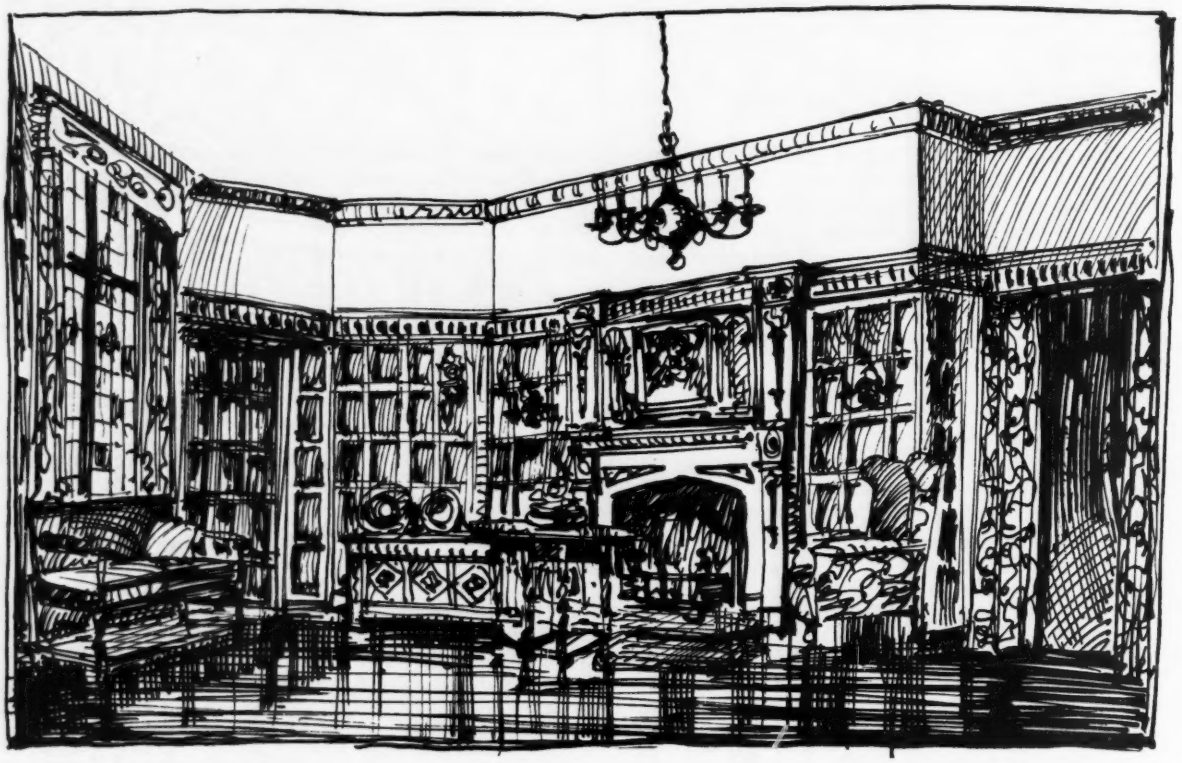
Brass chandelier showing Virgin & Child and St. George. Wide pans and pierced sockets are typical of the period. Arms are Gothic. Ring at bottom is for drawing fitting down from ceiling. c. 1434.

Possible form of Jacobean wall bracket. Little evidence survives.

Typical iron corona. Sockets were replacing spikes for the candles. Elizabethan.



Early Stuart 1625—1660



Impression of an interior at the beginning of the Stuart period.

Background

This period was the beginning of the later Renaissance and saw an increasing use of the classical style introduced by Inigo Jones.

Christopher Wren, who was an artist and inventor as well as an architect, eventually successfully solved the problem of adapting classical proportions to the requirements of English climate and materials. The Civil War created an unsettled period, and the severe and Puritanical outlook of the Commonwealth had no place for the luxury of decorative art and proved a serious check to its development.

Interior Decoration

Classical proportions brought a complete change in wall panelling. They were now raised instead of sunk, and a variety of panel widths was permissible. Oak was still in general use.

The main development on the already heavily decorated ceilings was the introduction of oil paintings, an outstanding example of which is in the Whitehall Banqueting House, which building constituted nothing less than an architectural revolution, following directly as it did on the free and picturesque Jacobean architecture.

Many Italian marble chimney pieces were imported.

Furniture

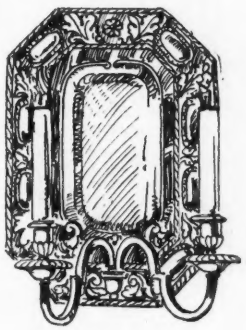
The furniture became less massive although retaining a similarity in decoration. Inlay was used, sometimes employing mother-of-pearl.

More items of furniture appeared—desks, gate-legged folding tables, side tables, and beautifully painted cabinets. . . . "Turkey work" used for chair coverings.

Lighting

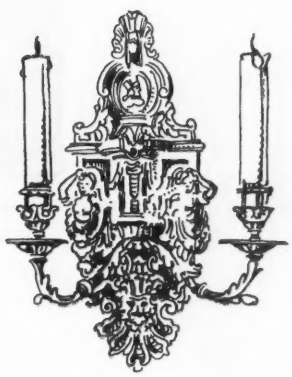
The brass and laten chandeliers of the seventeenth century rely for decorative effect upon their polished surfaces and scrolled arms. They are illustrated in many paintings of Dutch interiors.

NOTE.—Laten was an alloy of copper and tin used for the manufacturing of a variety of ecclesiastical and domestic objects during the fifteenth century, at the end of which it is described by John of Trevisa: "Also it hath colour and likeness of gold, but not the value. Of laten be composed divers manner of vessells, that seeme gold when they be new, but the first brightness dimmeth some, and becometh as it were rustie, and so both in colour and in smell of copper, the first matter thereof is knowen."



Typical late Jacobean - Early Stuart wall bracket. Repousse silver with polished centre panel acting as a reflector.

Polished brass six-light Flemish chandelier of the seventeenth century. The basic form continued to be used right through the eighteenth century.



French wall bracket—Louis XIII style. Silver, cast and chased.

Restoration or Late Stuart 1660—1688

Impression of a Flemish interior.

Background

After the Restoration, Charles II set an example of luxury and display, and as he had been exiled in Holland it was not surprising that a strong Dutch influence began to be felt. Decorative artists were given encouragement, and during this period the destruction by the Great Fire of London made a lot of rebuilding necessary. The amount of oak required for the main structures may have contributed to its restricted use for interiors.

Interior Decoration

This period is characterised by elaborate carving on mouldings, skirtings, dados, cornices, over doors, architraves, and chimney pieces. Many of Wren's splendid designs were carved by Grinling Gibbons, and frequently took the form of lime wood decoration applied to oak. A great variety of woods were employed for interiors and furniture. Towards the end of the century deal was introduced, being economical and invariably painted or gilt, which was done extensively about this time.

The practice of having oil paintings on the ceiling became more widespread, and designs by artists of the Dutch and French schools became popular. The incorporation of a china-shelf over the fireplace was also adopted from Holland.

Furniture

A new item was the chest of drawers with attractive metal drawer pulls. Cane was used for chair backs. Glass-fronted china cabinets were used in the second half of the century : walnut was popular and lacquer-finish appeared.

Mirrors with elaborately carved wood or wrought silver frames became accepted as a decorative feature for walls.

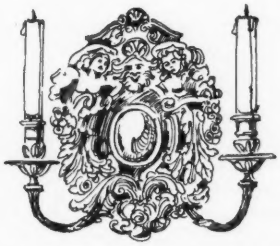
Lighting

Larger and more elaborate Flemish chandeliers evolved, sometimes with two or three tiers, with extremely graceful and slender arms. The stem usually continued to be smooth and globular, but towards the end of the century fluting was sometimes used, and the underside of the grease pans ornamented. A cast eagle with outstretched wings surmounted the top of the more elaborate models.

After the Restoration, wall brackets in the form of plates with flat or convex centres framed with an ornamented border became fashionable. Arms carried the nozzles and pans.

In France, the word "girandole" was used to apply to wall brackets with a cone of candles. Adopted in English catalogues about 1750.

Example of a more elaborate Flemish model.



Silver wall bracket. Charles II period.

Louis XIV ormolu bracket.

William & Mary and Queen Anne 1688—1714

Interior typical of the William & Mary period.

Interior typical of the Queen Anne period.

Background

Although at this time French influence was paramount throughout Europe, its effect in this country was limited, as it was entirely dominated by the work of Wren. After 1692 there was an influx from France of French artists and Italian craftsmen, and a remarkably stable period in decoration ensued.

Interior Decoration

Pine was now used instead of oak, and the ornamentation of panelling was well executed, with conventional egg and dart, egg and tongue, and a variety of Acanthus leaf carving. Focal points were embellished with fruit swags, flower wreaths and leaves. Marble was used for mantelpieces using bold bolection mouldings. Paintings were used both on ceilings and on walls.

Vanbrugh worked in this period and designed upon a grand scale but without delicacy, and added nothing to the refinement of ornament.

Furniture

This period has been described as " The Age of Walnut," and the beginning of the eighteenth century produced much superb furniture, especially chairs, small tables, and the lighter types of bureau and bookcase. The pieces were often decorated with burr and marquetry in large naturalistic patterns. The Queen Anne cabriole leg became the almost universal support for all kinds of furniture for the next 60 years.

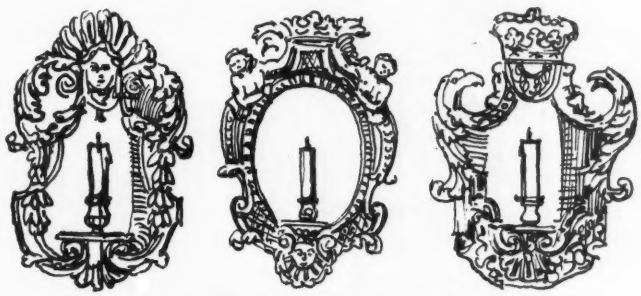
Lighting

There were further developments of wall-plate brackets and also a type with tall, slender back-plate appeared. Beautifully modelled silver, and mirror glass with diamond cutting were favoured types.

Rock crystal chandeliers were used about 1667, the crystal being imported from Germany, but cut in England, which led the world in this art. Metal chandeliers were very beautiful and some rare examples were in ivory.

The beginning of the eighteenth century saw wood gradually displacing the costly silver and rock crystal. Early examples showed a strong French influence, with elegant but substantial treatment of the arms for durability. Tassels adorned them. Later these chandeliers reached a high degree of elaboration.

Silver chandelier 1700, from Knole Park, Kent. Figures and ornament show Louis XIV influence.



Three typical ' wall plates.' William & Mary style with strong French Louis XIV influence. Note centre polished reflector panels.

Silver wall bracket in the more restrained style of the Queen Anne period.

Early Georgian 1714—1760

Impression of an Early Georgian interior.

Background

This period saw the start of many changes in which the interior decoration came under the aegis of the furniture designer, rather than as previously being the prerogative of the architect. William Kent was one of the first of these and decorated a number of large mansions largely in Italian style. However, much of his work is heavy, massive, and cumbrous. It is a period of fickle fashion, with periods of Baroque and rococo, turning at the end to a refined classicism.

Interior Decoration

Again there is a distinct change in panelling which was now often painted leaf-green, blue, or brown. Wall niches are usual. The panels have become recessed and the realistic carving of Gibbons superseded by classical motifs, notably the Greek key, although some plasterers made unsuccessful attempts to copy the carvings made by Gibbons; a riot of motifs became fashionable. The Italian style involved lavish use of decorative painting, stucco and marble.

Furniture

The ornament of this period was undoubtedly impressive but somewhat florid. Mahogany began to succeed walnut, bringing with it a complete change of designs.

Chippendale's work completely revolutionised the whole trade in England, the full effect not being felt until the next period.

Lighting

The gilt wood fittings at the start of this period had still a refined feeling, using "S" arms with long graceful sweeps.

For the first quarter of the eighteenth century wall brackets were still made in the Restoration style, but a variety of materials, including panels of needlework, were used to decorate the "back plate."

Chandeliers, wall brackets, and even candlesticks went through the florid phase, then Baroque and the bizarre rococo. Sconces in the same tier were alternated higher and lower to emphasise the bizarre effect. Although elaborate, the fittings generally carried relatively few candles, thus making lighting very expensive.

Carved wood six-light gilt chandelier, c. 1725.

Metal bracket showing detail associated with the early Georgian period.

Louis XV style ormolu bracket.

Late Georgian 1760—1811

Impression of an Adam interior.

Background

This period covering the reign of George III has been described as "The Golden Age of Furniture."

The brothers Adam created the late Georgian style, which is most distinctive in its gentle simplicity and gave attractive unification of both exterior and interior. Some processes used foreshadowed mass production.

Interior Decoration

The Adams introduced wall mouldings in low relief with medallions, cupids, winged animals, sea horses, etc. Delicate colours were used, such as French grey, Quaker brown, pink and green.

The smaller plaster ceilings were ornamented with concentric circles of delicately wrought garlands, and the larger incorporated oil paintings which, however, were now confined to circles, ovals or fan-shaped panels, each with a delicate frame. Wall mirrors became more prominent than ever and were often framed in ormolu.

Furniture

Chippendale became the undisputed leader in furniture design from about 1740 until his death, and was followed by the famous names of Hepplewhite and Sheraton.

These names are so well known and their work so prolific that little comment is possible. They all published books on their designs.

Chippendale copied the French fashion extensively, mostly using mahogany or rosewood set off with carving, which was sometimes gilt. Richly chased brass or silver mounts were mainly employed. Some furniture was soft wood japanned. Chippendale was also strongly influenced at times by Gothic and Chinese. He naturally advocated wood lighting fittings, claiming they were less expensive than metal or glass models.

The best designs of Hepplewhite combine lightness and simplicity. Chairs have typical oval or shield-shaped backs.

Sheraton went further in the direction of delicacy and harmony, but some of his later work is marred by too flimsy and extravagant forms.

Lighting

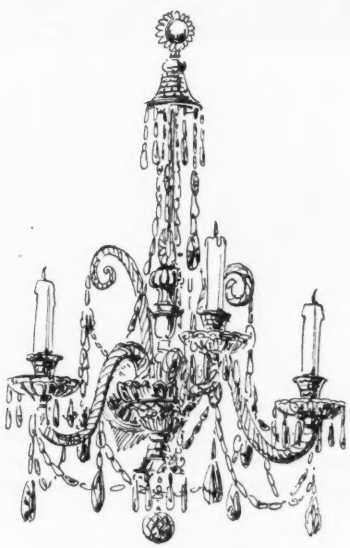
Many designs for lighting fittings of all types were published, candles being combined with other items of furniture or decoration, such as Chippendale wall mirrors—with mahogany and painted, or rococo gilt frame—fitted with arms carrying the sconces.

Good ormolu became obtainable for the first time in 1762.

During the last half of the eighteenth century, glass chandeliers (not rock crystal) began to be manufactured in England. An example of 1777 shows a glass centre stem as opposed to the French practice of using metal. Waterford glass appeared in 1780. Few designs survived in their original form, as the ladies amused themselves by frequently altering the glass arrangements to obtain a "new look."

Chelsea china was sometimes used for chandeliers during this period.

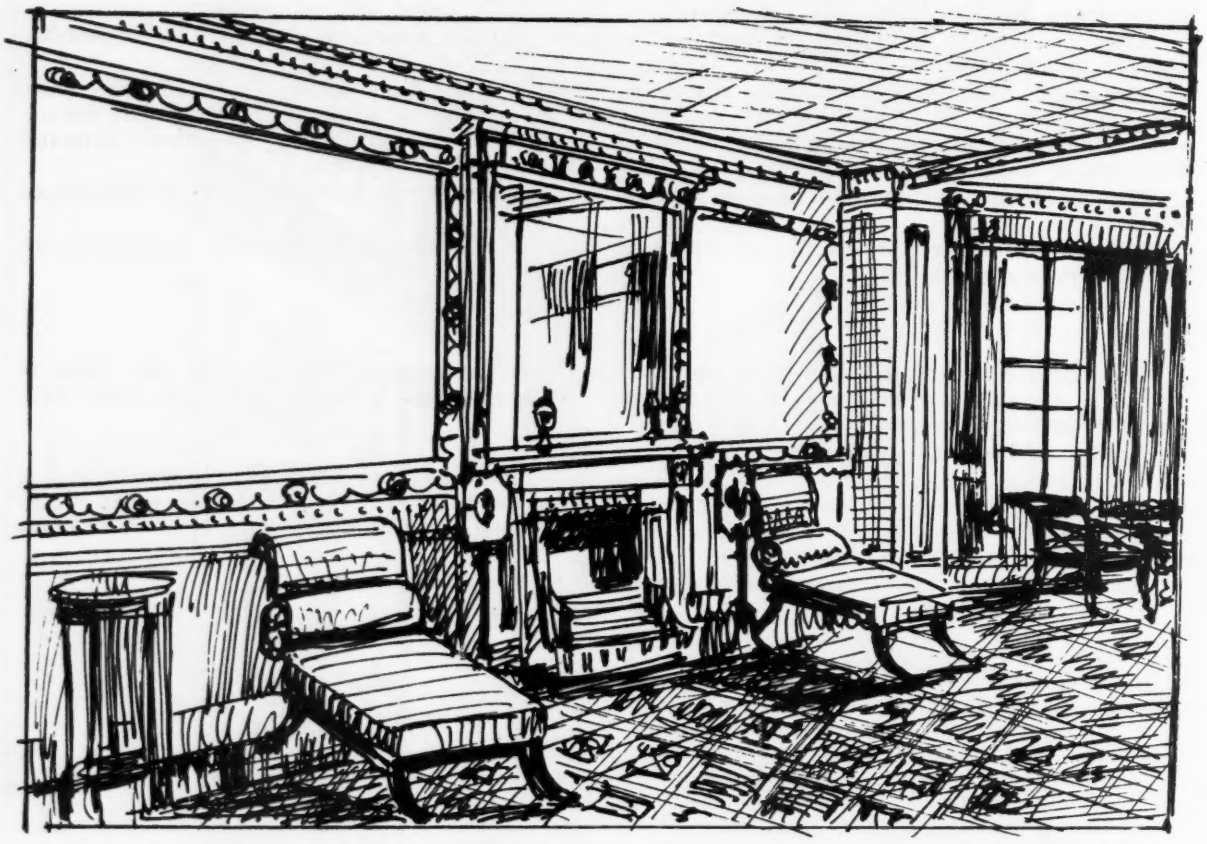
Girandole by Adam—gilt.



Early glass wall bracket.

Louis XVI wall bracket.

Regency 1811—1820



Impression of a Regency interior.

Background

Regency architecture generally continued the basic Georgian classical tradition. It used refined proportion with elegant trimmings often inspired by the Greek, carried out in stucco at a fraction of the cost of worked stone. Whilst Nash built his grand terraces, smaller residences appeared in a much lighter style, with tall, thin windows and ironwork balconies and verandas, which looked somewhat like unglazed conservatories.

Interior Decoration

Having reached the lovely interiors of Adam, the pendulum of fashionable taste swung again and demanded more richness and lavishness in the furnishing and decoration and, as on previous occasions, looked to France for inspiration. Here, the victories of Napoleon had produced a style known as " Empire," based mainly on the prolific use of Egyptian motifs, whilst the Prince Regent (later George IV) was experimenting with Eastern ornament in the

famous Brighton Pavilion. It is, therefore, not really surprising that this period brought no really distinctive form to interior decoration, which became largely a curious mixture of Egyptian, Greek, and Roman forms.

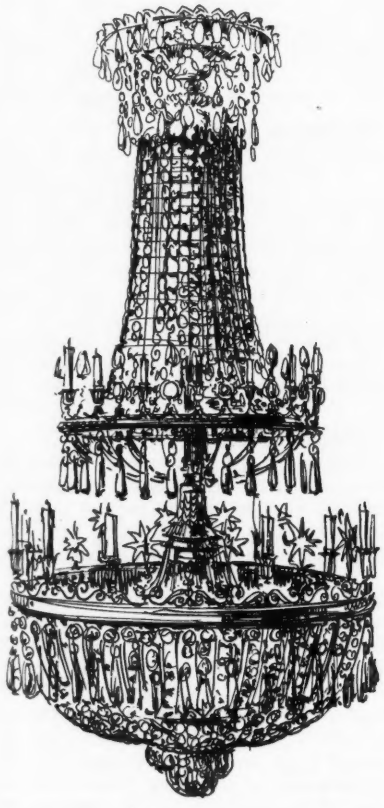
Furniture

Similarly, furniture was founded largely upon "French Empire" models, and crimson curtains with heavy bullion fringes were fashionable. Convex mirrors surmounted by an eagle were typical.

Lighting

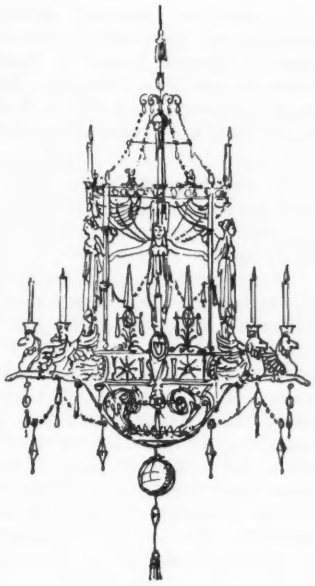
The morbid craving for novelty was also apparent in lighting fittings. Egyptian, Roman, and Greek motifs were employed, frequently without discrimination, and although dignified and refined chandeliers were occasionally produced, most fittings had little artistic merit.

The glass chandeliers became more ornate, with hoops from which the glass drops were hung. These hoops sometimes were in the form of highly decorated metal bands, chased and enamelled, to which the candle arms were attached. They became popular abroad and many glass chandeliers were exported.



An example of early nineteenth-century glass chandelier, illustrating the two basic forms of tent and hemisphere.

This example of a French Empire chandelier clearly shows the use of Egyptian ornament, which is the characteristic of this style.



Wall bracket—ormolu. French Empire style.

Candle-stand. French Empire style.

I.E.S. Activities

ANNUAL DINNER

The Society annual dinner and dance will be held at the Café Royal, Regent Street, W.1, on Wednesday, April 20. Tickets (35s. each) may be obtained from the I.E.S. Secretary, 32, Victoria Street, London, S.W.1.

HOME LIGHTING DISCUSSION

The discussion on home lighting at the meeting to be held at the Lighting Service Bureau, 2, Savoy Hill, at 6 p.m. on Tuesday, March 29, will be opened by a panel of four people, under the chairmanship of Mr. W. R. Stevens. The panel will include Miss Daphne Padell, who will describe the lighting in her new house (which has been featured on TV), her husband, Mr. J. D. G. Bodart, Mr. Paul Reilly of the Council of Industrial Design, and a lighting engineer. It is hoped that many ladies will be present and will take part.

PEEBLES MEETING

A week-end meeting arranged by the Edinburgh, Glasgow and Newcastle Centres will be held at the Peebles Hydro on May 6, 7 and 8. Papers will be given by J. M. Waldram and Jean Chappat. Full details of the meeting can be obtained from R. J. Fothergill, Northgate House, St. Mary's Place, Newcastle-upon-Tyne, 1.

London

At the London meeting on February 8 a paper on "The lighting of hazardous and corrosive locations in industrial plants" was presented by Mr. A. G. Palmer and Dr. W. E. Harper.

Many locations in industry are potentially hazardous because of the possible presence of inflammable mixtures of vapours, gases and dusts with air. Electrical apparatus, including lighting equipment, is one possible source of ignition, and special precautions are necessary both in the design and installation of equipment. The hazard of corrosion is more widespread than those of fire and explosion, but not infrequently the hazards occur together, calling for additional precautions. Where there is risk of fire or explosion, the equipment and installation must satisfy relevant official regulations, which are supplemented by a number of British Standards and Codes of Practice.

Probably the most common explosion hazard in industry is where certain vapours and gases may be present in sufficient concentration to form with air an incendive mixture. The necessary precautions must be taken even though the presence of such an incendive mixture may result only from an accident or plant breakdown. The most common form of protection for such locations is to instal flameproof equipment certified for operating in the particular gas or vapour. It is, however, sometimes difficult to obtain good lighting using flameproof fittings owing to the comparatively low light output of single units, and other methods are therefore frequently used. These include mounting the fittings outside the danger area and lighting by projection, the use of pressurised fittings and the design of plants to eliminate the hazard.

Fire and explosion caused by the ignition of dust and fibre suspensions in air are perhaps less well known than the vapour/air hazards, but this danger is widespread in industry. Where fittings must be mounted within the danger area, dust-tight fittings should be used. There is need for a British Standard specifying the construction and testing of such fittings. In some locations it is necessary to mount fittings outside the danger area and light by projection, although in dusty atmospheres light losses by absorption are usually considerable. Plants can sometimes be designed to reduce the dust concentration to a value which is not dangerous, so permitting normal lighting; modern flour mills are an example.

The dangers in plants manufacturing or handling explosives is so much greater than in other industrial plants that special precautions are necessary both for the installation and maintenance of lighting equipment. The type of fitting used in any particular location depends on the process; usually either flameproof or approved dust-tight fittings are specified.

The corrosion of metals and other forms of chemical attack on lighting fittings seldom result in danger, but they affect the performance of equipment and increase replacement and maintenance charges. There are, in general, four lines of defence against chemical attack—choice of materials, protective finishes, design details, and maintenance in service. One type of fitting which has proved successful in a very corrosive location on a chemical plant has a body cast in LM6 silicon-aluminium alloy. Light control is by a refractor bowl and the joints are sealed by rubber gaskets. Among the new protective finishes for the metalwork of fittings, paints based on the epoxide resins appear to offer much improved corrosion resistance. Even so, protection by paints can be only temporary, and the use of all-plastic fittings made from correctly chosen materials may prove most effective for corrosive locations. Corrosion can sometimes be greatly reduced by improved plant design which reduces the corrosives in the atmosphere, and this has been illustrated by new plants built for the gas industry. Good maintenance is essential for all fittings in hazardous locations, and they should be mounted so that access is safe and easy.

Nottingham Centre

At a sessional meeting held on January 6, Dr. R. G. Hopkinson and Mr. P. Petherbridge presented a paper entitled "Recent Studies in Glare," illustrated by lantern slides and films, and showing the work on this subject in progress at the Building Research Station. There were present 32 members and visitors who were very impressed by the obvious detail which had gone into this work. In the discussion which followed, which was opened by Mr. C. S. Caunt, many points of interest were raised, and the whole evening was felt to be a great advantage to the audience. A vote of thanks to the authors was proposed by Mr. P. Moore, vice-chairman of the centre.

Glasgow Centre

At the January meeting of the Centre Mr. F. Jones, of Babcock and Wilcox, Ltd., read his paper on "High Bay Lighting." He presented a very practical aspect of lighting for, as he put it, the works plant engineer has to live with his work and therefore has much more than a passing interest in its success.

There was always a calculated risk in introducing any new lighting ideas, but it was usually possible to experiment with a scheme in conditions similar to those which would affect the finished job. A lamp could be put up and actual measurements made under working conditions.

In order to assist speedy erection, as well as to economise in overall costs, as high a degree of standardisation as possible had to be aimed at in the original design. It was always difficult to get possession of travelling cranes to work in high bays, and most of the assembly was in fact carried out on the floor.

A striking comparison was shown between the costs of comparable schemes using 1,000-watt mercury discharge, 400-watt mercury discharge, and 1,000-watt tungsten lamps; the financial saving from the use of the 1,000-watt M.V. installation was decisively demonstrated.

An interesting discussion followed; one point in particular concerned the use of a 240-volt 1,000-watt lamp in place of the 420-volt design at present in use by Mr. Jones. He

(*Continued on page* 111)

I.E.S. Forthcoming Meetings

LONDON

March 9th

Trotter-Paterson Memorial Lecture, "The Brightness of the Stars," by Sir Harold Spencer Jones, Astronomer Royal. (At the Royal Institution, Albemarle Street, W.1.) 6 p.m.

March 29th

Discussion on Home Lighting. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

CENTRES AND GROUPS

March 2nd

EDINBURGH.—"The Evaluation of Lighting," by R. G. Hopkinson. (At the Manor Club, 12, Rothesay Place, Edinburgh 3.) 7 p.m.

NEWCASTLE.—"The Design and Application of Flameproof Lighting Equipment," by D. A. Strachan. (At the New House Lecture Theatre, Pilgrim Street.) 6.15 p.m.

March 3rd

GLASGOW.—"Flicker in Relation to Fluorescent Lighting," by R. G. Hopkinson. (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.) 7.30 p.m.

NOTTINGHAM.—"Colour and Colour Vision," by W. D. Wright. (At the Demonstration Theatre of the East Midlands Electricity Board, Smithy Row, Nottingham.) 6 p.m.

March 8th

STOKE-ON-TRENT.—"Home Lighting," by Mrs. J. W. Stewart. (Joint meeting with the Electrical Association for Women.) (At the Lecture Hall of the Midlands Electricity Board, 31, Kingsway, Stoke-on-Trent.) 6 p.m.

March 10th

MANCHESTER.—Members' Night. (At the Demonstration Theatre of the North Western Electricity Board, Town Hall, Manchester.) 6 p.m.

March 11th

NOTTINGHAM.—Ladies' Evening. (At the Victoria Station Hotel, Nottingham.)

March 14th

SHEFFIELD.—Paper by Miss H. M. Maurice.

March 15th

LIVERPOOL.—Members' Night. Four short papers by W. B. Parkinson; J. R. Parker, G. E. Shepherd; J. A. Watson and C. G. Lloyd. (At the Liverpool Engineering Society, 9, The Temple, 24, Dale Street, Liverpool.) 6.30 p.m.

March 16th

NORTH LANCASHIRE.—"Simple Measurement of Radiant Energy and the Calibration of Light Sources," by H. W. Cumming. (Joint meeting with the Preston Branch of the Association of Supervising Electrical Engineers.) (At the Demonstration Theatre of the North Western Electricity Board, 19, Friargate, Preston.) 7.15 p.m.

TEES-SIDE.—"Studies in Interior Lighting," by J. M. Waldram. (At the Cleveland Scientific and Technical Institute, Corporation Road, Middlesbrough.) 6.30 p.m.

March 21st

LEEDS.—Address by H. G. Campbell (Vice-President). (At the Lecture Theatre of the Yorkshire Electricity Board, Ferensway, Hull.) 7.30 p.m.

March 25th

BATH AND BRISTOL.—"Shop and Store Lighting," by R. L. C. Tate. ((At the South Western Electricity Board, Lecture Theatre, Old Bridge Street, Bath.) 7 p.m.

BIRMINGHAM.—Meeting at Rugby. (At the Lecture Theatre of the B.T.H. Co., Ltd.) 6 p.m.

March 28th

LEEDS.—Annual General Meeting. N.C.B. Film, "Buried Treasure." (At the E.L.M.A. Lighting Service Bureau, 24, Aire Street, Leeds 1.) 6.15 p.m.

LEICESTER.—"The Use of X-Rays in Medicine and Industry," by J. E. Hood and G. Whiteley. (At the Demonstration Theatre of the East Midlands Electricity Board, Charles Street, Leicester.) 6 p.m.

March 31st

GLASGOW.—Annual General Meeting. "Plant Cultivation," by W. W. Fletcher and J. B. R. Anderson. (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.) 7.30 p.m.

(*Continued from page* 108)

said that he had no four-wire three-phase systems, and could not consider the introduction of a neutral for lighting purposes only.

Sheffield Centre

The president, Mr. E. C. Lennox, visited Sheffield on December 13 and gave his presidential address in the Medical Library of the Sheffield University, Western Bank, Sheffield. A record number of members and friends attended this sessional meeting and greatly appreciated the honour paid to the Centre by the visit of the president.

After the meeting, an informal dinner was given in honour of the president by the Sheffield Committee. Besides the president, the guests included Mr. A. Haddock, Manager of the Yorkshire Electricity Board, Sheffield. Also present was Dr. W. J. Wellwood Ferguson, past president of the Society and also a member of Sheffield Centre.

Leicester Centre

At the Leicester Centre meeting on January 24 Mr. K. S. Morris gave a most interesting lecture on "Contemporary Lighting." He said that Sweden had been in the forefront of the contemporary movement. This began in the 1930s, and in Britain little progress was made until the Festival of Britain gave it fresh impetus.

Mr. Morris pointed out that contemporary fittings could not be dismissed as "squiggles of wire"; in fact, many materials were put to use, and in one fitting we might have a combination of wood, brass, glass and plastics. The designer aimed at an elegance of line and a more courageous use of colour. These points were very well illustrated in the lantern slides, both monochromatic and coloured, which accompanied the lecture.

Members of the Electrical Association for Women and the Domestic Science College were present and took part in the discussion.

Birmingham Centre

Some 200 members and friends of the Birmingham Centre were present at the Exhibition of Lighting Fittings held at the College of Technology, Birmingham, on Thursday, December 30. The meeting was opened by Mr. Sheppard-Fidler, City of Birmingham Architect, and in the course of his remarks he stressed the importance of correct lighting in our homes and places of employment. He also emphasised the great strides made by all manufacturers of lighting fittings.

Leading firms in the fittings industry had some very interesting things to show; each company had three minutes to explain the main points of their exhibits. The manufacturers represented were: Philips; B.T.H.; Metrovick; Falk,

At the Birmingham Centre dinner, January 14. *L. to R.: A. G. Sheppard-Fidler, J. W. Johnson, W. S. Lewis, Sir Herbert J. Manzoni, F. A. Blandford, E. C. Lennox, H. M. Fricke, Ald. G. H Griffith, and F. W. Haynes.*

Stadelmann; Benjamin; Thorn; Veritys; Smithlite; Fulford-Brown; Crompton Parkinson; Siemens; Revo; G.E.C.

The annual dinner of the Birmingham Centre was held at the Midland Hotel, Birmingham, on January 14. The dinner is the chief social event of the Centre and, as in the past, there were many representatives from allied interests present, the City of Birmingham being represented by the Deputy Lord Mayor, the City Engineer and Surveyor, and the City Architect. The President of the Society, Mr. E. C. Lennox, was also present.

The toast of "The Society" was proposed by Ald. G. H. Griffith, Deputy Lord Mayor, who commented on the progress made in electric lighting during the last 50 years. Mr. Lennox, in reply, spoke of the great contribution made by the Centre to the activities of the Society.

Mr. F. W. Haynes, chairman of the Centre, then proposed the toast of "The Guests," who, in addition to the Deputy Lord Mayor and the President, included Mr. F. A. Blandford, chairman of the South Midlands Centre of the I.E.E., Mr. S. T. Walker, president of the Birmingham and Five Counties Architectural Association; Mr. J. D. Johnson, chairman of the Birmingham Branch of the E.C.A.; Mr. H. M. Fricke, president of the Birmingham Electric Club; and Mr. A. Lightbourne, representing the A.S.E.E. Mr. Haynes then welcomed Sir Herbert Manzoni, City Engineer and Surveyor, and Mr. A. G. Sheppard-Fidler, City Architect, and Ald. W. S. Lewis, chairman of the Midlands Electricity Board.

Sir Herbert Manzoni, in reply to Mr. Haynes, said that the Society was fulfilling a useful function, and he was glad to see that it continued to make good progress.

The Birmingham Centre held their fifth Sessional Meeting on January 28, when four members of the Centre read papers on specialised subjects, the duration of each paper being approximately 15 minutes. N. W. Bertenshaw dealt with "Aspects of Museum Lighting." He neatly tied together the peculiar type of lighting required for museums to show to advantage their exhibits, and the economics required involved in this. He was followed by Mr. J. Beresford-Horniblow, who spoke on "Colour in Interior Decoration." He showed a fine collection of coloured slides of the many schemes he had supervised. F. C. Johnson then spoke on "Aspects of Industrial Lighting." Dealing with his own experiences in this field, Mr. Johnson gave brief advice on the way to tackle the many snags one came across from time to time. "Shop Window Lighting" was dealt with by Mr. R. C. Pennington. This paper emphasised the co-operation necessary between client, designers, window display artists, and the lighting engineer, if a suitable scheme was eventually to be arrived at.

Correspondence

Shop Lighting, etc.

To the Editor, LIGHT AND LIGHTING

Dear Sir,—It is not often that I find an opportunity to write to the technical Press and I make no apologies if, when the occasion does occur, my comments tend to range over more than one subject. Various matters touched upon in the January issue of LIGHT AND LIGHTING seem to call for further comment.

The meeting at which Mr. Tate's paper on shop lighting was presented seems to have been an unfortunate one judging by the comments in "Notes and News." As a consultant to one of the largest international groups of chain fashion stores I can assure you that the doubts expressed concerning the lighting engineers' interest in shops are quite unfounded. Frankly, I cannot recall having seen an announcement of this paper as I most certainly would have made a point of attending—I can only blame the oversight on pressure of work. Perhaps this gives a clue to the reason for the poor attendance since most lighting engineers concerned with shop lighting are at their busiest during the autumn.

The question of shop lighting is also mentioned by Mr. Penny in "Random Review." When he refers to the "forest of fittings hanging from the ceiling" he (apparently unknowingly) touches upon one of the main reasons for the neglect of this field. With the exception of one firm no lighting fittings manufacturer has attempted to design and manufacture fittings essentially for store application with the result that it is not possible to select from a number of competitive ranges. The large chain store operator can afford to overcome this obstacle by using designs specially developed for him and can order in quantities to keep the price down. The small shopkeeper is forced to use standard catalogue designs which are quite unsuited to the purpose. Even where large store groups are concerned I invariably find it is possible to reduce costs by 50 per cent. or more by issuing my own designs to general tender and undertaking final assembly myself instead of inviting designs for complete fittings from manufacturers.

I wholeheartedly agree with Mr. Penny's remarks concerning the need to educate contractors. The main difficulty lies in convincing the average contractor that he is not a lighting engineer and, furthermore, that he will not lose face by seeking assistance from a competent adviser. He must be persuaded that it is not sufficient to hang up the first thing that comes to hand and that his own prestige will be enhanced by a well-designed lighting installation.

I am also interested in the comments made in "Random Review" concerning fluorescent tube colours. I have long pressed the larger fluorescent tube manufacturers to develop colours closer to the Kelvin line, particularly in the region 2,700 deg. K. to 4,500 deg. K. The following extract from a letter recently addressed to the British Standards Institution on this subject may be of interest:—

"I find there exists a marked dissatisfaction among both actual and potential users on the grounds that fluorescent lighting possesses an unnatural character. This attitude appears most noticeable in the sales and display sections of the food and textile industries but its effect in other fields is by no means insignificant. In fact, during recent months there has been a tendency to revert to tungsten lighting in some new installations. I venture to suggest the reason is psychological. The non-technical man-in-the-street has become accustomed to artificial light sources closely approximating to true Kelvin values and it is not surprising if he experiences some degree of uneasiness, if not actual discomfort, when presented with light sources having no common colour denominator either between themselves or with what he has come to accept as a standard. . . . I suggest that a light source of a true Kelvin value produces much less of a psychological shock on the observer and further, assuming this to be true, that the resultant effect of small discrepancies in colour-rendering is much less marked. . . .

"I feel strongly that any B.S. covering fluorescent tubes should be designed with the following objects in view:—

(a) to discourage the use of Kelvin designations when referring to tubes which do not fall within the limits of true Kelvin values.

(b) to discourage the development of tube colours which do not approximate to true Kelvin colours."

In conclusion, I cannot pass over Mr. Penny's remarks on film studio lighting without comment. As a consultant to the film industry of some years standing I hasten to assure

him that the coming of the sound film did not, unfortunately, finish the arc lamp. It is true to say that arcs are rarely used with black-and-white stock but where colour is concerned a high percentage of arc lighting is still employed. As recently as 1950 the writer completed the construction of a 3,700 kw. studio power house which incorporates an elaborate smoothing system for the supression of arc noise and which is continuously monitored electronically. The preliminary investigations which preceded the design of this equipment produced an interesting study in threshold values of audibility.—Yours, etc.,

Walton-on-Thames. C. B. FAULCONBRIDGE.

Colour of Fluorescent Lamps

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—The comments in Postscript (December, 1954) concerning investigations in Switzerland into colour related to eyestrain, real or imaginary, reminds me of work carried out in this regard by Kruithof as early as 1941. The results obtained by Kruithof were graphically set out and is a useful reference in choosing the "colour" of fluorescent tubes or light source to obtain a satisfactory installation.

Briefly it was found that for any given level of illumination there is only a limited range of colour temperature which should be used if an unpleasant lighting effect is to be avoided. The use of a higher colour temperature will result in the lighting being considered dim or cold whereas a lower colour temperature, that is sources emitting a "warmer" light, will give distortion of colours. The graph shows that fluorescent tubes of colour range above 4,000 deg. K. should not be used unless the illumination level exceeds 20 ft.c., whilst incandescent lamps create noticeable colour distortion if used for an installation of 50 ft.c. or more.

Perhaps this proves that complaints against installations, particularly of fluorescent sources, are not entirely without foundation when related to source "colour" but have little connection with "stray ultra-violet."—Yours, etc.,

Sydney, N.S.W. L. S. HYATT.

Church Lighting

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—I have been reading with interest the booklet issued by the Church Information Board on the Installation of Electricity in Churches, which in its pages includes a section giving "general guidance on the principles of church lighting."

The author, with his panel of advisers, gives some very reasonable general rules, and then, in proceeding to details, discloses a surprising ignorance of modern practice. Not one of the experts named has, as far as I am aware, sufficient interest in lighting to join the I.E.S., yet they have the effrontery to cast doubt on recommendations of the I.E.S. Code.

This booklet will be accepted by Anglican authorities throughout England, and observance of its recommendations is obligatory. Members of the I.E.S. who hold lay office should do all in their power to limit the circulation of the booklet until some truly expert advice replaces the childish comments now included. An indication of the authors' outlook is the use of the pedantic plural "lumina."—Yours, etc

Bearsden, Dunbartonshire. CHARLES KING.

Lighting and Visibility in Mines

To the Editor, LIGHT AND LIGHTING.

Dear Sir,—There is one point referred to in Dr. Roberts's excellent paper (Trans. Illum. Eng. Soc. (London) **20,** No. 1, 1955), which I believe I can help to clarify. On page 20 he deduces the "visual range in comfort" to be expected under certain conditions of mine lighting, employing for the purpose the relation between apparent and physical brightness which was published in a paper on Brightness and Contrast in Illuminating Engineering (Hopkinson, R. G., Stevens, W. R., and Waldram, J. M., Trans. Illum. Eng. Soc. (London) **6,** 37 (1941)). The point under discussion is whether to take the whole field of view in determining the adaptation level, or a zone within 10 deg. of the object of regard as proposed by Waldram (J. M. Waldram *ibid,* **19,** 95 (1954)).

Strictly, the data should be interpreted for the experimental conditions for which they were obtained, that is, a two-part field seen in an adapting surround embracing the whole field of view. The published curves were, however, derived from a synthesis of other experimental results as well, especially the published data of Abribat (Reunion de l'Institut d'Optique (1935)) and of Pitt (Proc. Phys. Sc. **51,** 810, (1929)). Abribat used a full field adaptation, but a multi-partite discrimination field, and so his conditions corresponded to those of Dr. Roberts's study. Pitt, however, used a Binocular matching technique in which the adapting fields of the two eyes were different. Subsequently the data of the 1941 paper were checked by another method. (Hopkinson, R. G., *Light and Lighting,* **54,** 10, (1951)).

Most of the available evidence shows that the apparent brightness (luminosity) is determined chiefly by the luminance of the whole visual field, but that local effects, e.g., simultaneous contrast, can in some circumstances be important and even decisive. Such limiting circumstances include those when the visual task demands continuous concentration on a limited part of the field in such a way that a degree of local adaptation can result. Dr. Roberts may be able to say from his experience whether this is so in the examples he mentions. If it is, it would seem reasonable to base the deductions of apparent brightness on an adaptation level corresponding to the luminance of a restricted field of view.—Yours, etc.,

Watford. R. G. HOPKINSON.

Situations Vacant

LIGHTING FITTINGS ASSISTANT required. London area. Applicant should be able to prepare drawings and coloured sketches, and have knowledge of construction. Write giving full particulars and salary required to Box No. 883.

Young ELECTRICAL DRAUGHTSMAN for engagement on a wide variety of installation work. Should be fully competent to design and draft lighting and power schemes for all types of buildings and to supervise site works. Good salary in accordance with experience. Previous knowledge of professional work not essential. Write in confidence giving particulars of age and experience to A. J. P. Pashler, Consulting Engineers, 50, Newhall Street, Birmingham, 3.

Fully trained LIGHTING ENGINEER required for London office. Applicant must be well educated and conversant with modern lighting methods. Apply Senior Lighting Engineer, Ekco-Ensign Electric Ltd., 45, Essex Street, Strand, W.C.2.

ENGINEER required for Technical Sales Dept. at the London Head Office of a large lamp manufacturer to assist in commercial aspects of development of all types of electric lamps. Previous experience of a similar nature and technical training in the lamp industry essential. Age 25/30. Good prospects of advancement. Pension scheme, etc. Apply Box A915, c/o Central News Ltd., 43, London Wall, E.C.2.

JUNIOR TECHNICAL ASSISTANT (20-25) for the preparation of lighting schemes, Illuminating Engineering Dept., old established Mfrs. lighting equipment. State age, experience, salary required. Chief Engineer, Technical Service Dept., Holophane Ltd., Elverton St., Westminster, S.W.1.

POSTSCRIPT By "Lumeritas"

In the most recently published Annual Report of the Chief Inspector of Factories covering the year 1953 (H.M.S.O., London, price 6s. 6d.), satisfaction is expressed with the generally high standard of new artificial lighting installations in factories. In the opinion of the Factory Inspectors, a solution for practically every industrial lighting problem can be provided by a suitable selection from the wide variety of light sources and of fittings now available, and with the aid of competent lighting experts who are also available to those who need their advice. Reference is made to the effectiveness of combinations of mercury vapour lamps and tungsten lamps in large and lofty shops in heavy industries as well as to the more discriminative use of fluorescent lighting. The Chief Inspector stresses the need for improvement in the lighting of outdoor areas where much work is done when daylight is not available. One of the best methods of lighting such areas—which are found, for example, in brick and tile works, iron and steel works and in chemical works—is the installation of powerful projectors on towers. This is considered preferable to the traditional method of lighting by a multiplicity of low-power sources at lower mounting heights which give pools of light with intervening areas of inadequate brightness. He mentions a brick works where sodium lamps are installed on 30-ft. columns, and also a steel works where the whole outside area is lighted by batteries of 1,000-watt lamps mounted on 150-ft. towers. It is interesting to note the growing use of this method which was advocated and tried by Cunnington for the lighting of railway marshalling yards before the last war.

Those who have any regard for the antiquities of lighting will be interested to learn of the recent finding of a clay oil lamp among the remains of the Roman town at Caerleon, in Monmouthshire. The lamp is a small one —about three inches long—and has on its base a pattern of dots forming a monogram consisting of the Greek letters χ and ρ. This pattern is said to be a secret symbol used by early Christians to reveal their faith to fellow converts at a time when it was dangerous to be an overt dissenter from the religion—chiefly Mithraism—of the occupying power. To-day, the second letter in the monogram—rho—is the symbol we use in lighting formulae for reflection factor, and the first letter—chi—is familiar enough to those who are concerned to evaluate the results of lighting experimentation as designating a statistical test. The lamp is regarded as one of the most important discoveries ever made in the locality; it has more than a lighting interest-value for me since it was unearthed within a stone's throw of my paternal homestead.

The latest protest against the installation of sodium street lighting comes from residents of "London's Little Venice"—as Ruskin called a certain area in the Borough of Paddington which is traversed by the Grand Junction Canal. In this locality, within its stucco Regency style houses, dwell architects, writers, artists and others who regard sodium light and 25-ft. concrete lamp standards as wholly out of place in "Little Venice." Voicing their protest in a national newspaper, Lord Kinross said "the use of sodium lighting is an affront to any civilised residential area," and "the use of concrete as a material for lamp standards is utterly incompatible with stucco as a material for architecture." "In Little Venice," he said, "any other form of lighting, and any form of steel post, would be preferable." It must be conceded that sodium light plays havoc with colours, but, where residential areas follow part of the course of busy traffic routes, should the aesthetic shortcomings of sodium lighting be reason enough for breaking the continuity of a good installation? Some highway authorities have, indeed, vetoed this illuminant as a detraction from local amenities, and there are numerous individuals who, like —for example—the chairman of the Mill Hill Preservation Society, think it "disfigures everything—and everyone," and to whom its use is "a major indignity." But even these people seem generally to appreciate that sodium lighting is giving excellent visibility on many roads—which, of course, is its chief function. And what commends it to those who spend the public's money on street lighting is that it gives this good visibility a little cheaper than other good—and in some ways preferable —lighting systems. As for concrete standards, I am no lover of some of them, but, having seen "London's Little Venice" and the lamp standards being erected there, I do not feel that they are any more unsuitable and inartistic than the iron standards they are supplanting. No doubt I am something of a Philistine, but objections to these things can be overdone. And, although the objectors would disagree with me, I think their antipathy to the new lamp standards springs partly from reluctance to part with what they have grown accustomed to and have endowed with undeserved merit. It is said that "Little Venice" deserves to be spared from sodium lighting, but its beauties should not be overrated. It is relatively picturesque, having regard to the general drabness of its environs, but this, perhaps, is only to damn it with faint praise.

An unusual case has recently been decided in the High Court. A London motorist sued the Ministry of Works, claiming damages for injuries and shock suffered when his car hit a traffic island in Hyde Park because the lamps on the island had not been lit. He was awarded £750 and his wife was awarded £300. A defence plea of negligence on the part of the claimant was rejected, and a witness stated that on two successive nights at about the period of the accident he saw cars collide with an island in the East Carriageway. To the suggestion that the motorist should have used his headlights, it was replied that any attempt to do so on this highway immediately provoked "a glare of signals and flashing" by oncoming drivers. The lighting of the road was said to be old-fashioned and quite inadequate, but, as this description fits the lighting of so many of our roads, one wonders whether local authorities will find themselves involved in similar legal actions relating to road accidents in their areas.